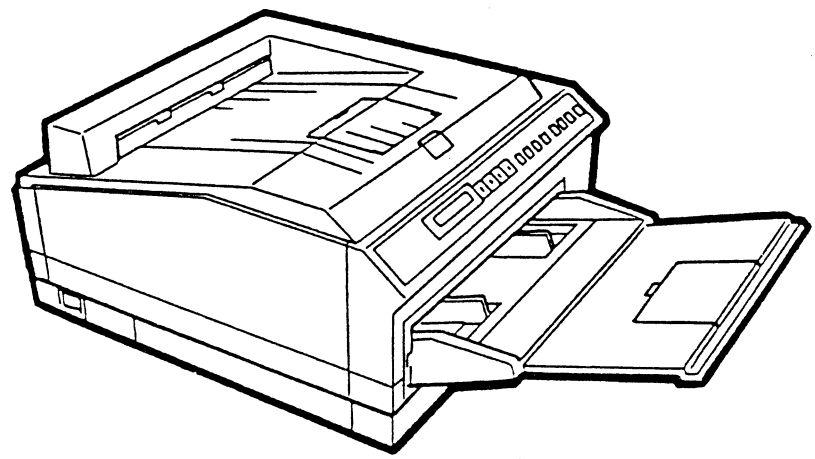
Laser Beam Printer

NMS1474

Service
Service
Service

Service Manual



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NMS1474
CHAPTER:1- SPECIFICATION

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1.Summary

1.1 Scope

This specification applies to the NMS1474 Laser Beam Printer.

1.2 Features

This is a compact desk top laser printer which has the following features.

1) NON IMPACT PRINTING METHOD

Non impact printing method using semiconductor laser beam scanning and electrophotographic technology, resulting in low noise and suitable to use in office environment.

2) HIGH SPEED PRINTING

Printing speed is 4 pages per minute (4 ppm) (Letter, A4).

3) HIGH QUALITY PRINTING

High quality printing can be achieved by 300 DPI resolution for text or graphics.

4) EASY REPLACEMENT OF CONSUMABLES

Operator can easily replace toner, drum and other consumables.

5) PAPER HANDLING

Paper handling has been designed that Face Down or Face Up outputs can be selected by one touch lever.

6) SMALL and LIGHTWEIGHT

This printer is designed to be small and lightweight and occupies small space for installation.

7) EMULATION

HP LaserJet IIP (Resident) and 5 kind of emulations are available as option, Diablo 630, EPSON FX-850, IBM Proprinter XL/XL24e, HP-GL and PDL Emulation.

2 MB expansion RAM module is needed to use PDL Emulation.
1 MB expansion RAM module is needed the 300 dpi printout for HP-GL Emulation.

8) ONE CARTRIDGE SLOTS

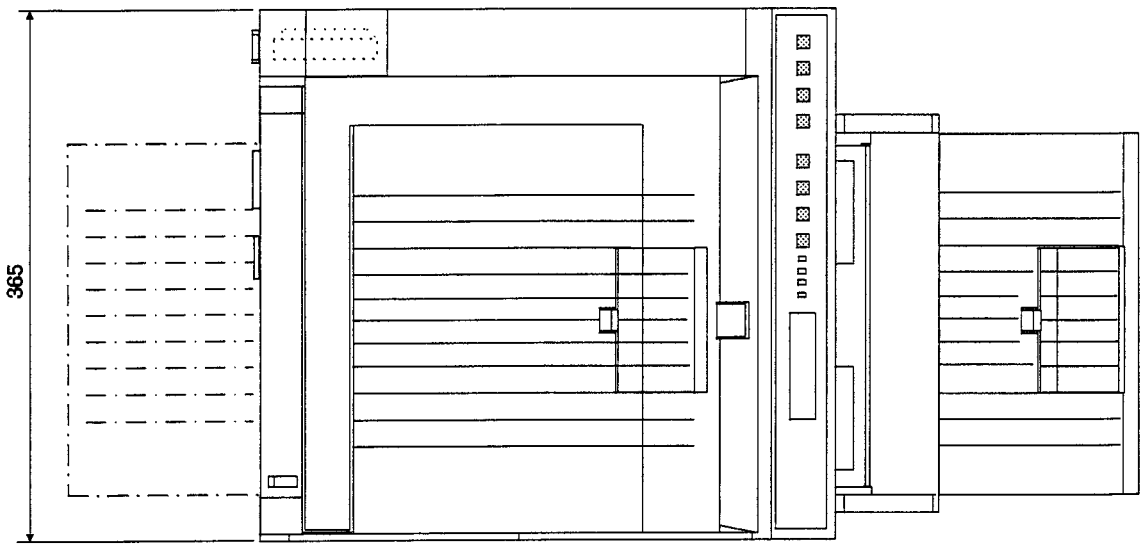
One cartridge slot is provided. This slot is used for emulation cartridges and font cartridges.

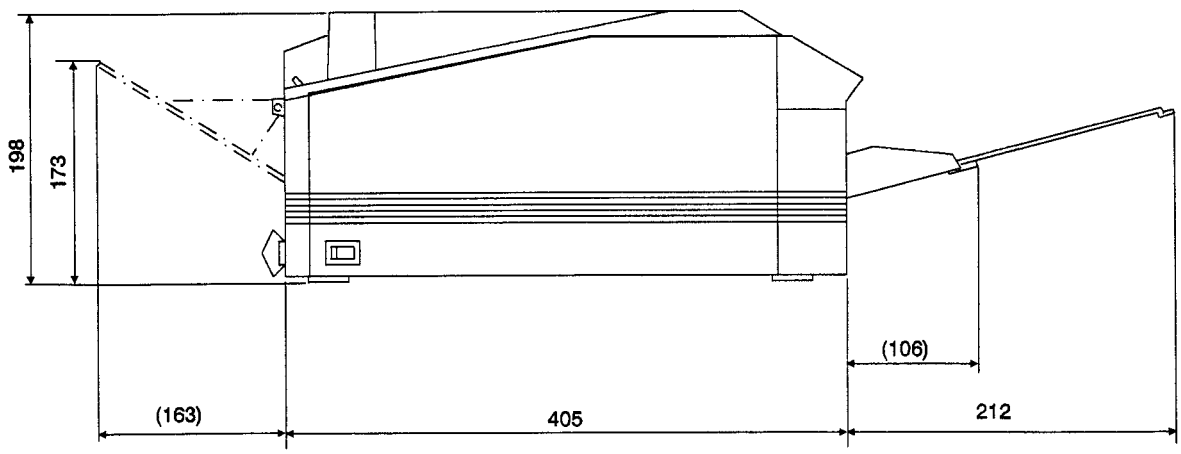
9) EXTENSIBLE MEMORY

1M Bytes, RAM Module can be added by mounting it on the main PCB.
Thus up to one full page bit image can be processed.

2. Outside View

2.1 Appearance





2.2 Dimension

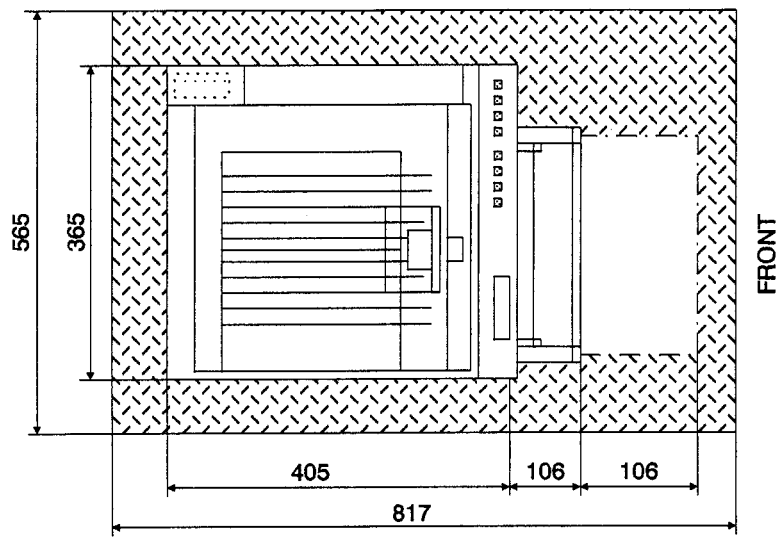
14.3 (W) x 15.9 (D) x 7.7 (H) inches
(365mm) (405mm) (198mm)

2.3 Weight

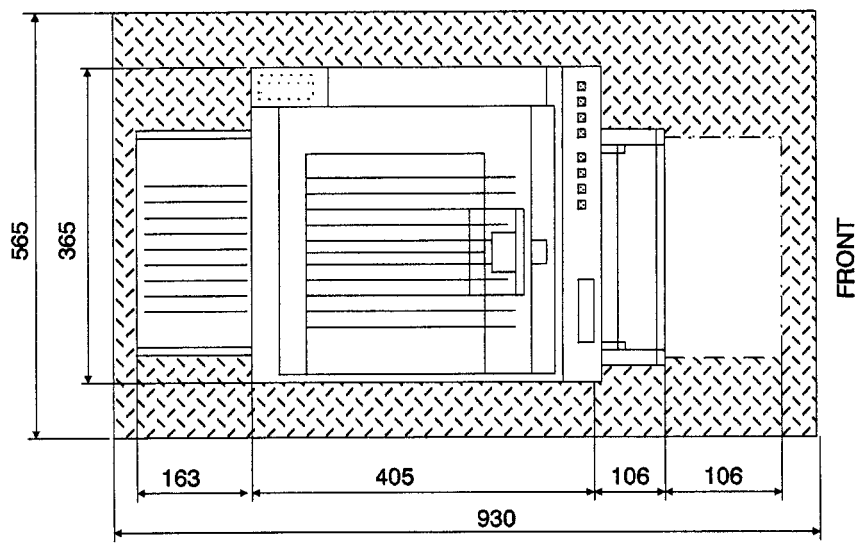
28.7 lbs (13kg)

2.4 Occupying Space

Without Face Up Tray



With Face Up Tray



3. Basic Specification

3.1 Type

Desk-Top Type

3.2 Print Method

Laser Beam Scanning with Dry Type Electrophotography

Laser Beam Scanning:	Semiconductor Laser Polygon Mirror Scanner	
Dry Type Electrophotography:	Photoconductor:	OPC Drum
	Exposure:	Laser Beam Scanning
	Fixing:	Heat Roll Fixation

3.3 Print Speed

First Print:	Approx. 34 sec. (Face Down) (Letter, A4)
Cassette Feed:	4 Pages/min. (Letter, A4) (at Continuous Print)
Warm up time:	Approx. 1 min. (at 23 degrees C / RAM 512K bytes)

3.4 Resolution

300 x 300 dots/inch

3.5 Emulation

-	Resident Emulation:	HP LaserJet IIP *Note 1 (Emulation can be selected from operation panel)
-	Option Emulation (Cartridge):	Diablo 630 Epson FX-850 IBM Proprinter XL or IBM Proprinter XL24e HP-GL (HP7475A) PDL (Postscript Emulation)

3.6 Memory

<RAM>

Standard Memory:	512 K Bytes
(User Memory:	395 K Bytes)

Option: The extension memory module is used for printing bit image graphics which cannot be printed only with the memory in the printer or when the memory in the printer is not sufficient for font down loading and Macros.

Note 1: This printer emulates the PCL commands of HP LaserJet IIP within the description of the HP manual.

3.7 Font

Resident Font: 14 Fonts

. Courier 12 point Medium	(Port.,Land.)
. Courier 12 point Bold	(Port.,Land.)
. Courier 12 point Italic	(Port.,Land.)
. Courier 10 point Medium	(Port.,Land.)
. Courier 10 point Bold	(Port.,Land.)
. Courier 10 point Italic	(Port.,Land.)
. Line printer 16.6 pitch	(Port.,Land.)

Note: Fonts can be automatically rotated to Landscape.

Font Cartridge: The font cartridge contains several kinds of font sets. They are selected by a series of font select commands or the function menu.

3.8 Interface

It has three kinds of interface (two interface connectors)

. 8 bit-Parallel
. RS-232C or RS-422A (selected by Dip Switch)

3.9 Paper Size

Cassette Feed: Letter, Legal, A4, B5, Executive
(60 - 105g /m^2) (16 - 28 lbs)

Manual Feed: Width 82 - 216mm (3.2" - 8.5")
Length 127 - 356mm (5" - 14")
(60 - 120g/m^2) (16 - 32 lbs)

Special Paper: Envelope, Transparent Sheet and Label sheet.
(Conditions are separately defined.)

Recommended Paper:

Letter:	XEROX 4024	(75 g/m^2, 20 lbs)
Legal:	XEROX 4024	(75 g/m^2, 20 lbs)
Executive:	XEROX 4024	(75 g/m^2, 20 lbs)
A4:	NEUSIEDLER	(80 g/m^2, 21.3 lbs)
B5:	NEUSIEDLER	(80 g/m^2, 21.3 lbs)

(Refer to Appendix 3 about the other special papers.)

3.10 Paper Cassette

One Multi paper Cassette slot is prepared.
Letter, Legal, A4, B5, Executive
Up to 100 Sheets (80g/m^2)(21.3 lbs)
Paper insert direction is a Portrait only.
(Portrait is defined as printing across the narrow section of the paper.)

2nd-bin feeder (up to 300 sheets A4 or Letter, 80g/m^2) can be added as a user option.

3.11 Output Tray

Face Down and Face Up output Tray (changeable by one touch lever.) Face Down Tray is up to max 100 sheets (80g/m^2). If these sheets are over 100 sheets, please remove the paper from the printer. Face Up Tray is option up to 20 sheets (80g/m^2)(21.3 lbs).

3.12 Acoustic Noise Level

Printing:	Less than 46 db(A)
Standby:	Less than 35 db(A)
(Measurement method:	ISO-7779)

3.13 Power Supply

AC 100V:	50/60Hz
AC 120V:	60Hz
AC 220-240V:	50Hz
(Selectable from 3 types.)	

3.14 Input Voltage

100V +/- 10%:	50/60Hz +/- 3Hz
120V + /- 10%:	60Hz + /- 3Hz
220 - 240V +/- 10%:	50Hz +/- 3Hz

3.15 Power

Consumption	Approx. 600W

3.16 Environment

Operating	Temperature:	10 - 35 degrees C (50 - 95 degree F)
	Humidity:	20 - 80 % RH *Non condensing
Storage (6 months)		
<Printer>	Temperature:	0 - 35 degrees C (32 - 95 degrees F) - 20 - 0 degrees C (-4 - 32 degrees F) (10% for the terms of storage) 35 - 60 degrees C (95 - 140 degrees F) (10% for the terms of storage)
	Humidity:	20 - 85% RH *Non condensing
<Toner, Drum>	Temperature:	0 - 35 degrees C (32 - 95 degrees F) (2.5 years) - 20 - 0 degrees C (-4 -32 degrees F) (18 days) 35 - 40 degrees C (95 - 104 degrees F) (18 days)
	Humidity:	20 - 85 % RH *Non condensing
<Transport Printer>	Temperature:	-20 - 60 degrees C (-4 - 140 degrees F)
	Humidity:	20 - 90% RH *Non condensing
<Toner, Drum>	Temperature:	-20 - 40 degrees C(-4 - 104 degrees F)
	Humidity:	20 - 90 % RH *Non condensing

3.17 Printable Paper Face

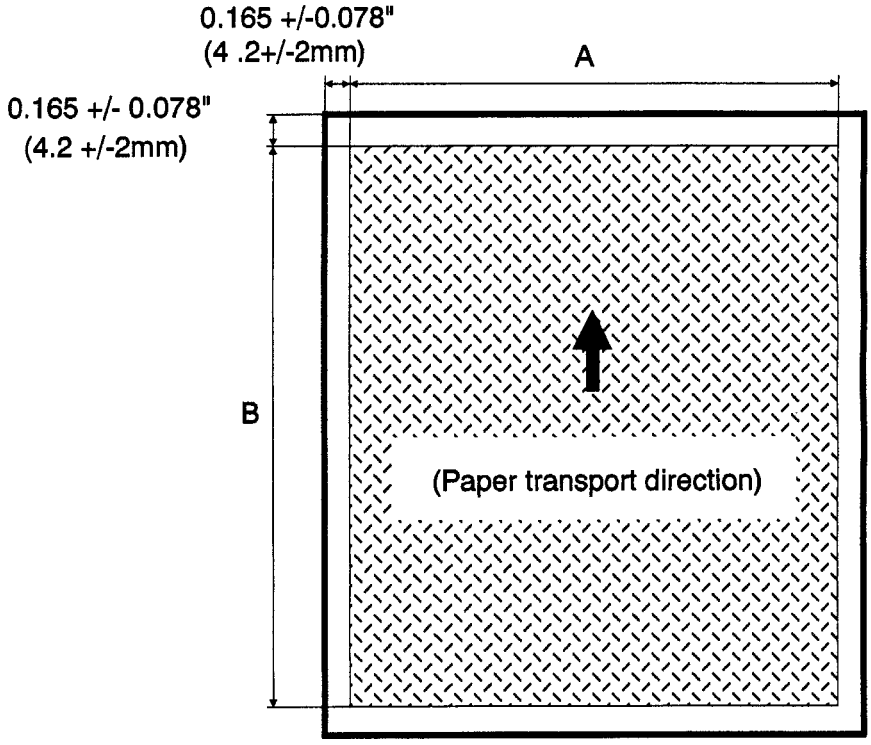
This printer has the possibility to print both sides, 1st Page print quality is guaranteed in this specification, but, reverse side print quality can not be guaranteed.

3.18 Safety Standards

	Kind of Safety Standards	Voltage
IET Safety	UL 1950 (D3 deviations)	120V
	CSA C22.2 No. 950 (D3 deviations)	120V
	TUVEN60950/09.87	220/240V
Laser Safety	CDRH Class 1 Laser. Title 21 Code of Federal Regulations, SubChapter J.	120V
	TÜVDINVDE0837/02.86/IEC825	220/240V
EMI	FCC Part 15 Subpart J (class B)	120V
	ZZF (VDE-0871 class B and VDE-0875 class B)	220/240V
	VCCI C.I.S.P.R. Publication 22	100V
	DOC Radio Interface Regulations, CRC, C1374 (class A)	120V

3.19 Printable Area

The area of print quality guaranteed by engine.



Form	A	B
Letter (8.5" x 11")	8.17"	10.67"
Legal (8.5" x 14")	8.17"	13.67"
A4 (210mm x 297mm)	202mm	289mm
B5 (182mm x 257mm)	174mm	249mm
Executive (7.25" x 10.5")	6.92"	10.17"

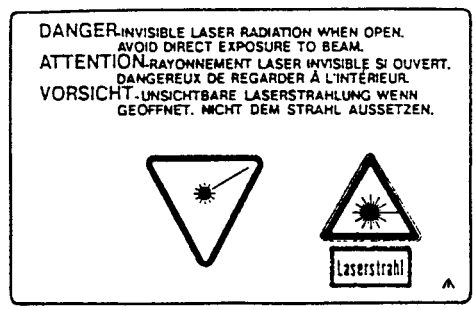
3.20 Labels

CAUTION-Use of control or adjustments or performances of procedures other than those specified herein may result in hazardous radiation exposure.

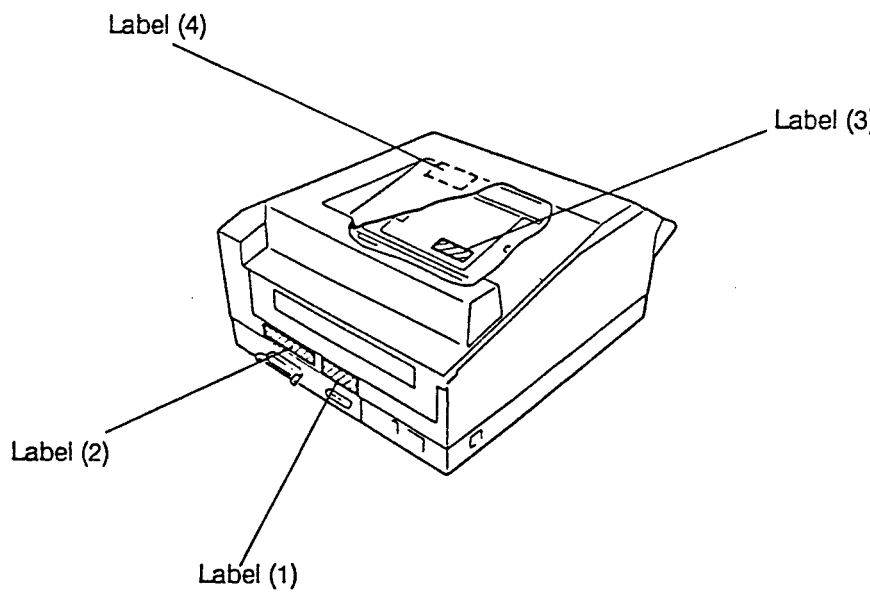
Label (1)

Label (2)

Label (3)


DANGER-INVISIBLE LASER RADIATION WHEN OPEN.
AVOID DIRECT EXPOSURE TO BEAM.
ATTENTION-RAYONNEMENT LASER INVISIBLE SI OUVERT.
DANGEREUX DE REGARDER À L'INTÉRIEUR.
VORSICHT-UNSICHTBARE LASERSTRAHLUNG WENN
GEÖFFNET. NICHT DEM STRAHL AUSSETZEN.
Laserstrahl

Location of labels



4. Reliability

4.1 Recommended Duty Cycle

2,500 sheets / month

4.2 Definition of Failure

Printer failure is the failure which the operator can not fix. Exclude the failure caused by improper installation or operator misuse.

4.3 Life

Unit Life:	5 years or 150,000 sheets (Which ever comes first.) (Regular service by service thechnician every 80,000 sheets.)
Drum Life:	10,000 sheets/unit (Letter size paper, printed area 5% of the sheet)
Toner Life:	1,500 sheets/unit (Initial Toner 750 sheets / unit) (Letter size paper, print area 5% of the sheet)
Transfer Charger:	80,000 sheets / unit
Cleaning Pad:	1,500 sheets / unit

4.4 MTBF / MPBF (Target)

MTBF	3,000 hours
MPBF	30,000 sheets (Which ever comes first.)

4.5 MTTR (Target)

Less than 30 minutes.

4.6 Reliability of Paper Feed

Jam Error:	1 / 2,000	
Multiple Feed Error:	1 / 1,000	
Another Error:	1 / 2,000	(folded at edge, wrinkles, etc....)

Note: Multi paper Cassette feed, use recommended paper.

*Above values are valid under the following condition.
. Standard temperature and humidity. (23 + /- 2 degrees C, 50 + /- 5% RH: ISO-554)
. Operated at rated voltage.

4.7 Maintenance

1) Operator Maintenance

(1)	Change Toner Cartridge	: 1,500 sheets / unit
(2)	Heat roller cleaning Pad	: 1,500 sheets / unit
(3)	Drum unit	: 10,000 sheets / unit

2) Service thechnician Maintenance : every 80,000 sheets

Main changing units

(1) Developer unit
(2) Fixing unit
(3) Ozone Filter
(4) Feed rubber rollers and belts
(5) Friction unit
(6) Transfer Charger

4.8 Option Parts

1.	Face Up Tray	
2.	Additional Memory (1M, 2M)	Note 1
3.	Emulation Cartridge	: Diablo 630
		: Epson FX-850
		: IBM Proprinter XL or IBM Proprinter XL24e
		: HP-GL (HP7475A)
		: PDL

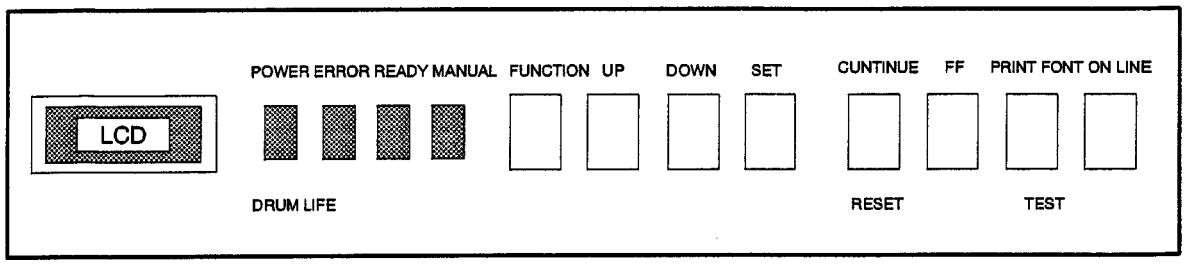
Note 1: (1) Main PCB have a configuration to select the size of RAM module.
(2) Up to RAM modules can be installed. : 1 set of 1M module set.....1MB
: 2 sets of 1M module set.....2MB

4.9 2nd-bin feeder

Up to 300 Sheets (80g / m^2, 21.3 lbs)
Support Paper size is A4 or Letter.

5. Operation Panel

5.1 Layout



Operation keys: ON LINE
FONT / PRINT TEST
FF
RESET / CONTINUE
FUNCTION
UP
DOWN
SET

Indicator

LCD	16 characters LCD	
LED	POWER / DRUM LIFE	(Green/Red)
	READY	(Green)
	MANUAL	(Green)
	ERROR	(Red)

5.2 Function

5.2.1 Operation Key

ONLINE Key

"ON LINE" Set Printer to "OFF - LINE" state. Send "BUSY" signal to the host. Complete the print to the current page and then stop printing.

"OFF LINE" Set Printer to "ON - LINE" state. Send "READY" signal to the host. If it is in error state, the printer will ignore.

FORM FEED Key

This is valid when LCD indicates "PUSH F. F. KEY" or "DATA EXIST". In the above conditions, push this key to resume printing.

CONTINUE / RESET Key

"ON LINE" Invalid.

"OFF LINE" Holding this key more than five seconds, printer make reset function. In reset function, printer clears the received data in the data buffer and initializes itself. If AUTO CONT function is off, this key will clear error mode. (ERROR 20, ERROR 21, ERROR 22, ERROR 40 and PAPER SIZE ERROR are for example.)
In the Function/Menu mode, holding this key within five seconds, printer quits set-up mode and enters "OFF-LINE" state. Change items in the set-up mode is invalid. In the Function /Menu mode, holding this key more than Five seconds, printer shows "MENU RESET" and rewrites factory default value as power-up default.

PRINT FONT / TEST Key

"ON LINE" Invalid.

"OFF LINE" When push this key within five seconds, prints font sample. LCD indicates "FONT PRINT". When push this key more than five seconds, prints status page. LCD indicates "STATUS PRINT".

FUNCTION Key

"ON LINE" Invalid.

"OFF LINE" Switch alternately for function/menu mode and normal mode.

UP Key

"ON LINE" Invalid.

"OFF LINE" Select for function and menu progress. When button is pushed, moves one step forward. Invalid in normal mode.

DOWN Key

"ON LINE" Invalid.

"OFF LINE" Select for function and menu progress. When button is pushed moves one step backward. Invalid in normal mode.

SET Key

"ON LINE" Invalid.

"OFF LINE" Set function and menu. When pushed at function mode, it enters the menu mode. When pushed at menu mode, it sets at the present indicated menu and returns function mode.
"*" indicates menu set by the key.
Invalid at normal mode.

Up and Down Key

"ON LINE" Invalid.

"OFF LINE" Prints test program. LCD indicates "SELF TEST". This test print will print out ASCII character rotation pattern.

5.2.2 Indicator

LED

POWER / DRUM LIFE	Indicates Power is "ON" and Drum Life. 1 to 7,499 sheets: light on Green 7,500 to 9,899 sheets: light on Orange 9,900 to 10,100 sheets: light on Red
ERROR	This LED indicates ERROR.
READY	This LED indicates ON LINE, OFF LINE or processing status. ON LINE state: Light on Green OFF LINE state : Light off Processing state: Blink on Green
MANUAL	LED lights on manual paper feed state.

LCD Indicates printer status, error status and function/menu.

Printer Status Indicate	**Function**
WAIT	Indicates warm up status.
ON LINE LTR	Indicates "ON LINE" status. (kind of paper)
OFF LINE LTR	Indicates "OFF LINE" status. (kind of paper)
FONT PRINT	Indicates during Font print.
INITIALIZE	Initializing (Reset the current function setting value and clear RAM.)
SELF TEST	Test printing (The sliding pattern)
STATUS PRINT	Test printing (The currently status)
PUSH F.F. KEY	Requesting "PUSH F.F. KEY" at manual paper feed state and ready for print.
DATA EXIST	Indicates that the data remain in the buffer.
Warning Status Indicate	
LOAD [paper size]	Indicates that the F&M paper setting does not match the current printer's paper size. If the paper size command is sent to request that to change a paper size, the display will ask you to set the correct paper size.
FONT CART [slot name]	When Font Cartridge is removed in the OFF-LINE mode with some data existed in the printer, the message of "FONT CART LEFT" or "FONT CART RIGHT" or "FONT CART BOTH" will be shown on the LCD.
ADD MEMORY	When user use the PDL Emulation without 2M Byte RAM Module, this message will indicate.

ERROR Status

COVER OPEN	Indicates cover open state.
PAPER JAM	Indicates paper jam state. This error can recover the lost page which data are not fully sent to the printer engine.
INSERTION ERROR	Paper will not go in even print start command arrives. This error can be recovered lost page.
PAPER EMPTY	No paper in paper cassette.
TONER EMPTY	Toner is empty.
CHANGE DRUM	Indicates 3 kinds of status as follows. 1) Printed page amounts to ten thousand. 2) Drum unit does not exist at POWER ON. 3) Drum counter does not exist at POWER ON.
FONT CART ERROR	When Font Cartridge is removed in the ON-LINE mode, this error message is shown on LCD.
PAPER SIZE ERROR	Indicates that the F&M paper setting does not match the size of the paper used.

Note: When the above mentioned errors are recovered, OFF LINE message is indicated instead of error message. Printing restarts by pressing ON LINE key.

CPU ERROR	Indicates the printer's CPU calculation error. When this error occurs, printer will change the Function setting to previous setting automatically.
ERROR 11	Internal ROM or Emulation cartridge checksum error.
ERROR 12	RAM error.
ERROR 20	Memory Over flow. When you set the font downloading or Macros, if these function use beyond the limits of user RAM area, this error will occur.
ERROR 21	Print Overrun Error. When printer can not be in time to develop the print data to print, this error will occur.
ERROR 22	Receive Buffer Overflow. When printer receive the data to over the run buffer size, this error will occur.
ERROR 30	Memory Error. When printer Engine makes Memory Error, this error will occur.
ERROR 31	Scanner Error. Indicated when the printer detects Polygon Motor syncronous Error.

ERROR 32	Heater Error. Indicated when the printer detects Heater Error.
ERROR 34	Fan Motor Error Indicated when the printer detects Fan Motor Error.
ERROR 35	High Voltage Error Indicated when the printer detects High Voltage Error.
ERROR 40	Parity / Framing Error. Indicated when you use serial interface and the printer detects Parity/Framing Error.

ERROR CLEAR FUNCTION

1) ERROR 11, ERROR 12, ERROR 30, ERROR 31, ERROR 32, ERROR 34, ERROR 35 and CPU ERROR are recovered by turning Power switch to "OFF".

2) ERROR 20, ERROR 21, ERROR 22, ERROR 40, PAPER SIZE ERROR are recovered in two ways. One is AUTO CONT=ON mode, Printer indicates Error message 10 second then clears Error condition by itself. The other is AUTO CONT= OFF mode, this mode keeps Error condition until RESET Key is entered.

3) PAPER JAM, INSERTION ERROR, CHANGE DRUM, TONER EMPTY, COVER OPEN are recovered after the cause of errors are cleared, and then the printer comes to "ON LINE".

4) PAPER EMPTY and FONT CARTRIDGE ERROR are recovered after the cause of errors are cleared, and then the printer comes to "ON LINE".

5.3 Defining Function / Menu

Function / Menu can be set by FUNCTION, UP, DOWN, and SET keys, and the contents are displayed on the LCD. The function / menu will be effective when the reset process is completed or power switch is turned OFF and ON again.

5.3.1 Function / Menu Indication

Function / Menu mode consists of route and sub-directory.
The construction is as follows.

Route	SUB 1	
MAIN	PAPER SET COPIES | | INDICATE	
I/F	PARALLEL RS-232C or RS-422A	(depending on Dip SW 4, 6 ,7, 8)
	BAUD RATE PROT | | ROBUST-XON	These indications are shown when serial I/F is selected.
HP2P	FONT SOURCE FONT NUMBER | | SYMBOL	
DI630 EPSON IBM HPGL PDL	These indications are shown when option cartridge is installed.	

Main Directory

Indication		Description
PAPER SET=	LTR * LEG A4 (*1) B5 EXE	Sets size of paper in the cassette. (*1)...defalt value for Europe Version.
COPIES=	01 * | 99	Sets number of copies.
MANUAL FEED=	OFF * ON	Selects manual feed.
THICK PAPER=	OFF * ON	Selects paper thickness.
AUTO CONT=	ON * OFF	Auto continue set.
TRAY= *6 *6 *6	2nd ONLY 2nd MC BOTH	Selects paper source. 2nd Only: Can not use from the multi paper cassette. The default is 2nd bin. 2nd: The default is 2nd bin. MC: The default is the multi paper cassette. BOTH: The default is 2nd bin. This function is indicated, when 2nd bin is attached.
2nd SIZE=	LTR * A4 (*1)	Sets size of paper in 2nd-bin feeder. (*1)——Default value for Europe Version. This function is indicated, when 2nd bin is attached.
EMULATION=	HP2P* IBM DI630 HPGL EPSON PDL	Sets kind of emulation. (If the emulation cartridge is set, the printer will show emulation name on this menu.)
STATUS PRT=	ON OFF *	Selects whether status paper is printed or not after power is on.
POWER ON=	ON LINE * OFF LINE	Selects "ON" or "OFF LINE" when power is on.
DATA BUFFER=	01 02 * | 99	Sets the size of data buffer. (02 is 2K Bytes) If PDL Emulation is selected, this value is set to 10K bytes automatically.
OVER LOAD=	01 10 * | 40	Sets by percentage of data buffer. (10% of data buffer (2K bytes)) =200 bytes

TIME OUT=	OFF * ON	Selects time out print or indication of "DATA EXIST". OFF: indication of "DATA EXIST" ON : time out print
TIMER=	01 | 30 * | 90	Selects print start time on time out print function.
INDICATE=	US * FR GE IT SP	

Note: * Indicates "Factory Default".

I / F Directory

I/F=	PARALLEL * RS-232C or RS-422A	Selects kind of Interface. (depending on DIP SW 4, 6, 7,8)

When Serial Interface is selected, LCD indicates as follows.

Indication		**Description**
BAUD RATE=	19200 9600 * 4800 2400 1200 600 300	Selects transmission speed.
PROT=	RDY / BSY(H)* RDY / BSY(L) XON / XOFF	Sets kind of protocol.
DATA BIT=	8 * 7	Sets data bits to 7 or 8.
PARITY=	NONE * ODD EVEN IGNORE	Sets kind of parity check.
STOP BIT=	1 * 2	Sets number of stop bits to 1 or 2.
ROBUST-XON=	ON * OFF	ON: Additional Xon's will be transmitted at One second intervals until data is received. OFF: Additional Xon's are not trasmitted.

Emulation Directory

HP LaserJet IIP (If this emulation is selected, the printer will show this menu.)

Indication		Description
FONT SOURCE=	I * C S	Selects default font source. I : Internal font. C : Cartridge font. S : Download font.
FONT NUMBER=	000* | n	Selects default font. Number n vary according to the font source. (n</=999)
ORIENTATE=	PORT * LAND	Sets the direction of a page.
FORM=	005 | 060* 064 (*1) | 128	Sets the number of lines printed per page. (*1)— default value for Europe Version.
SYMBOL=	ROMAN8 * ECMA-94 PC-8 PC-8DN PC-850 ISO 2 ISO 4 ISO 6 ISO 10 ISO 11 ISO 14 ISO 15 ISO 16 |	ISO 17 ISO 21 ISO 25 ISO 57 ISO 60 ISO 61 ISO 69 ISO 84 ISO 85 GERMAN SPANISH	Selects symbol set of resident font. A symbol set is a unique sub-grouping of all the available characters in a font. Each symbol set is defined with a specific set of applications in mind.

Note: When HP Emulation menu is not selected in MAIN, the printer will not show this menu.

Diablo 630 (If the emulation cartridge is set and it is selected, the printer will show this menu.)

Indication		Description
FONT SOURCE=	I * C	Selects default font source. I : Internal font. C : Cartridge font.
FONT NUMBER=	000 * | n	Selects default font. Number n vary according to the hont source. (n</=999)
ORIENTATE=	PORT * LAND	Sets the direction of a page. (Same as HP Emulation)
SYMBOL=	ROMAN8 * ECMA-94 PC-8 PC-8DN PC-850 ISO 2 ISO 4 ISO 6 ISO 10 ISO 11 ISO 14 ISO 15 ISO 16 ISO 17 ISO 21 ISO 25 ISO 57 ISO 60 ISO 61 ISO 69 ISO 84 ISO 85 GERMAN SPANISH	Selects symbol set of font. A symbol set is a unique sub-grouping of all the available characters in a font. Each symbol set is defined with a specific set of applications in mind.
SPACE=	10 CPI * 12 CPI 15 CPI PS	Sets character space for character.
SKIP-OVER=	1" * NONE	Chooses whether to use skip over or not.
AUTO LF=	CR + LF CR *	Selects function of carriage return code.
AUTO CR=	OFF * ON	Sets Auto WRAP function.
TOP OF FORM=	0 | 3 * | 12	Sets Top Margin position. (n/12")

Note: When DI630 emulation menu is not selected in MAIN, the printer will not show this menu.

Epson FX-850 (If the emulation cartridge is set and it is selected, the printer will show this menu.)

Indication		Description
ORIENTATE=	PORT * LAND	Sets the direction of page.
CONDENS=	NORMAL* CONDENS	Selects normal or condensed characters.
ZERO=	UNSLASHED* SLASHED	Selects zero with slash or without slash.
INTL CG=	USA* FRENCH GERMANY UK DENMK 1 SWEDEN ITALY SPAIN 1 JAPAN NORWAY DENMK 2 SPAIN 2 LATIN	Selects international character.
SKIP-OVER=	1" * NONE	Chooses whether to use skip over or not.
AUTO LF=	CR + LF CR*	Selects function of carriage return code.
CG TABLE=	ITALIC* GRAPHI	Selects from character table.
TOP OF FORM=	0 | 3* | 12	Sets Top Margin position. (n/12")

Note: When EPSON emulation menu is not selected in MAIN, the printer will not show this menu.

IBM Proprinter XL (XL24e) (If the emulation cartridge is set and it is selected, the printer will show this menu.)

Indication		Description
ORIENTATE=	PORT * LAND	Sets the direction of page.
CHARACTER=	SET1* SET2 SET2'	Selects character set. (SET2'....NORWAY/DENMARK)
ZERO=	UNSLASHED* SLASHED	Selects zero with slash or without slash.
SKIP-OVER=	1" * NONE	Chooses whether to use skip over or not.
AUTO LF=	CR + LF CR*	Selects function of carriage return code.
AUTO CR=	LF + CR LF *	Selects LF+CR or LF as LF Command.
TOP OF FORM=	0 | 3 * | 12	Sets Top Margin position. (n/12")
FONT=	US* MULTI	Selects initialize font area to U.S.A. or multilingual. This function is valid when XL24e Emulation is used.
AGM MODE=	ON OFF *	Selects AGM mode or not. This function is valid when XL24e Emulation is used.

Note: When IBM Emulation menu is not selected, the printer will not show this menu.

HP-GL (If the emulation cartridge is set and it is selected, the printer will not show this menu.)

Indication		Description
SIZE=	US A4 * US A3 MET A4 MET A3	Selects kind of paper.
PEN WIDTH=	1 * 3 5 7	Selects thickness of pen width (pen width= n/300")
ROTATION=	0 * 90	Selection Orientation

PDL (If the emulation cartridge is set and it is selected, the printer will show this menu.)

Indication		Description
MODE =	BATCH * INTERACT	Selects communication mode.

5.4 Using the Function Menu

This section describes the operation method in function/menu setting mode in the following steps.

1) Basic Operation for Function/Menu
2) Operation for Main Menu.
3) Operation for Sub-menu.

The present status of the function/menu can be known through the contents of the function / menu (F&M) displayed on the LCD. You can judge whether the selected state is on the function side or menu side, through the F&M display methoed displayed on the LCD (the selected side is blinked).

<Example> To select the paper size function in the main menu:

F&M LCD Display

PAPER SET	= LTR*
	Blinking display

5.4.1 Basic Operation for Function/Menu

(1) How to Enter or Leave the Function / Menu Setting Mode.
Key Operation ([ ]) / LCD Display (F&M Select [ ]) Printer status.

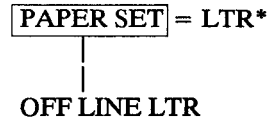
1) Press the [ON LINE] key to place the printer off-line. — OFF LINE LTR

2) Press the [FUNCTION] key to enter the F&M mode. (First F&M display of route Directory) — DIRECTORY = [MAIN]

The effective keys in this state are "FUNCTION", "UP, "DOWN", "SET" and "RESET" only.

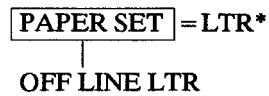
3) Press the [SET] key to enter main menu.

4) Press the [FUNCTION] key to leave the F&M mode, placing the printer off-line.

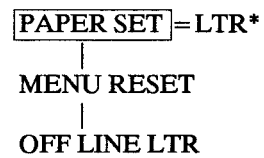


or

4)' Press the [RESET] key within 5 seconds to quit the F&M mode, placing the printer off-line.



4)" Press the [RESET] key more than 5 seconds to set factory default, placing the printer off-line.



Note: The difference between the methods 4) and 4)' and 4)" by which the F&M mode is deactivated is described in the next page.

How to Leave F&M Mode	Specification
4) FUNCTION Key (Valid when the key is pressed in any hierachy in F&M mode)	The contents of the menu selected in F&M mode are retained.
4)' RESET Key (within 5 Seconds) (Valid when the key is pressed in any hierachy in F&M mode)	The contents of the menu selected in F&M mode are discarded.
4)" RESET Key (more than 5 Seconds) Holding the RESET/CONTINUE key down until "MENU RESET" is displayed.	The Factory Default value is set to the E^2PROM and execution RAM.

5.4.2 Operation for Main Menu

(1) Function Item Switch (Select) operation.
This section describes the switch (select) operation for 14 items variable as functions in the main menu.
Key Operation ([ ]) /LCD Display (F&M Select [ ]) Printer status.

1)	Press the [ON LINE] key to place the printer off-line.	OFF-LINE LTR	
2)	Press the [FUNCTION] key to enter the F&M mode. (First F&M display of route directory)	DIRECTORY =	[MAIN]
	Press the [SET] key to enter main menu. Press the [UP] key.	[PAPERSET] =	LTR *
3)	The next function is entered. Press the [UP] key.	[COPIES] =	01 *
4)	The next function is entered. Press the [UP] key.	[MANUAL FEED] =	OFF *
5)	The next function is entered. Press the [UP] key.	[THICK PAPER] =	OFF *
6)	The next function is entered. Press the [UP] key.	[AUTO CONT] =	ON *
7)	The next function is entered. press the [UP] key.	[EMULATION] =	HP2P *
8)	The next function is entered. Press the [UP] key.	[STATUS PRT] =	OFF *
9)	The next function is entered. Press the [UP] key.	[POWER ON] =	ON LINE *
10)	The next function is entered. Press the [UP] key.	[DATA BUFFER] =	02 *
11)	The next function is entered. Press the [UP] key.	[OVER LOAD] =	10 *
12)	The next function is entered. Press the [UP] key.	[TIMEOUT] =	OFF *
13)	The next function is entered. Press the [UP] key.	[TIMER] =	30 *
14)	The next function is entered. Press the [UP] key.	[INDICAT] =	US *
15)	The route directory is restored.	DIRECTORY =	[MAIN]

Note: A function in the main menu is switched with the UP or DOWN key. The UP key only is used in the above example. However, the operation with the DOWN key is the same as with the UP key except that the preceding function is entered.

(2) Menu Item Switch (Select) Operation.

This section describes how to switch (select) the menu using the main menu function " PAPER SET " as an example.
Key Operation ([ ]) / LCD Display (F&M Select [ ]) Printer Status.

1)	Press the [ON LINE] key to place the printer off-line.	OFF-LINE LTR	
2)	Press the [FUNCTION] key to enter the F&M mode.	DIRECTORY =	[MAIN]
3)	Press the [SET] key to enter the main menu.	[PAPER SET] =	LTR *
4)	Press the [SET] key, and the menu will be selected. (Select the menu contents as "B5".)	PAPER SET =	[LTR *]
5)	Press the [UP] key three times, and "B5" will be selected.	PAPER SET =	[LTR *] (1st time)
		PAPER SET =	[LEG] (2nd time)
		PAPER SET =	[A4] (3rd time)
		PAPER SET =	[B5]
6)	Press the [SET] key, "B5" will be selected and the function will be selected as F&M.	[PAPER SET] =	B5 *

Note: After the menu is entered, the item is renewed with the UP or DOWN key. To leave the menu, press Function Key.

6. Drum Counter

The change in the color of the Power / drum life LED from green to orange (7500 copies), to red (9900 copies) indicates the upcoming need to replace the drum unit. At 10,000 copies, the printer stops and displays the message "CHANGE DRUM". Pressing the ON LINE key after the "CHANGE DRUM" message will allow a further 100 copies to be printed.

* From copy 10,000 to 10,090, press the ON LINE key for each 10 copies.
  From copy 10,091 to 10,100, press the ON LINE key resume one or two copies.

7. Interface

Interface

It has three kinds interface 8 bit-Parallel, RS-232C and RS-422A and can be selected by function / menu.

7.1 8 bit-Parallel Interface

7.1.1 Connector

36 pins receptacle connector.
Amphenor 57-40360 series or equivalent.

7.1.2 Signal Function

Pin No.		Signal Name	IN/OUT	Function
Signal	Return			
1	19	$\overline{\text{DATASTROBE}}$	IN	Description sync. signal to receive data from the host.
2	20	DATA1	IN	Data from the host. (High = "1")
3	21	DATA2	IN	
4	22	DATA3	IN	
5	23	DATA4	IN	
6	24	DATA5	IN	
7	25	DATA6	IN	
8	26	DATA7	IN	
9	27	DATA8	IN	
10	28	$\overline{\text{ACK}}$	OUT	Request to send data.
11	29	BUSY	OUT	When BUSY is HIGH, the printer cannot receive data.
12		PE	OUT	When PE is HIGH, the printer runs out of paper.
13		SELECT	OUT	When SELECT is HIGH, the printer is ONLINE.
14, 36		Reserved		Not defined.
16		OV	--	Signal ground.
17		CHASSISGND	--	Chassis ground.
18		+5V	--	5V source. (300mA Max.)
31	30	$\overline{\text{INPUTPRIME}}$	IN	Set the printer to the Initial stage after data inside buffer is printed.
32		$\overline{\text{FAULT}}$	OUT	$\overline{\text{FAULT}}$ goes LOW when any malfunction or error occurs in the printer.
15 34	33 35	NC		Not defined.

Signals

a) $\overline{\text{DATA STROBE}}$
- . Synchronizing pulse and input signal for reading data.
- . Negative logic signal. Data is read when the signal turns from "High "to "Low" level.
- . Minimum pulse width of 1 μs.

b) DATA1-DATA8
- . Input signal corresponding to each bit of data.
- . Positive logic signal.
- . Minimum pulse width of 3 μs.

c) $\overline{\text{ACK}}$
- . Data input acknowledge pulse signal which is output when the printer is ready to receive data. Thus, it is also output when the OFF LINE state changes to an ON LINE state.
- . Pulse width of about 6 μs.

d) BUSY
- . This signal is an output signal which indicates that the printer is BUSY.
- . Positive logic signal indicating a BUSY condition, when High.

e) PE
- . This signal is an output signal which indicates that there is no paper in the paper cassette.
- . Positive logic signal indicating a paper empty state, when High.

f) SELECT
- . This signal is an output signal which indicates whether the printer is ON LINE or OFF LINE.
- . Positive logic signal indicating an ON LINE state, when High.
- . This signal goes LOW when the printer is placed OFF LINE by the depression of the ON LINE key or occurrence of an error.

g) $\overline{\text{INPUT-PRIME}}$
- . Pulse input signal which places the printer in the same initial state as when the power has been turned on. In cace there is any unprinted data, the printer prints the data and ejects the paper and then returns to its initial state. HP emulation is invalid this signal.

h) $\overline{\text{FAULT}}$
- . Output signal which indicates that the printer is in a Fault state.
- . Negative logic signal indicating a Fault state, when low. This signal stays in high level both ON LINE and OFF LINE condition.

i) +5V
- . Not a signal but a +5V power supply output.
- . Provides a maximum current of 300mA.

j) CHASSIS GND
- . Frame ground for circuit protection.

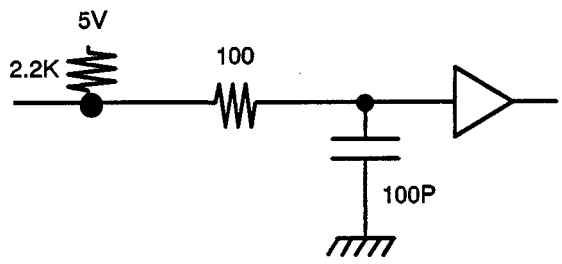
7.1.3 Signal Level

Output Signal	Input Signal
V_{0L} = 0 - 0.4V	V_{1L} = 0 - 0.8 V
V_{0H} = 2.4 - 5.0 V	V_{1H} = 2.0 - 5.0 V

7.1.4 Input / Output Circuit

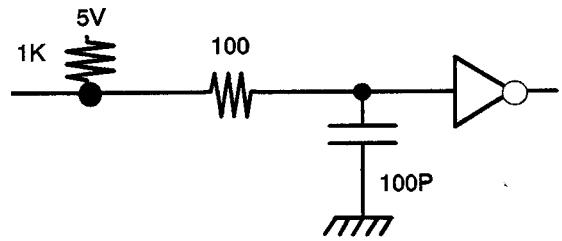
Input Circuit

DATA1 - 8



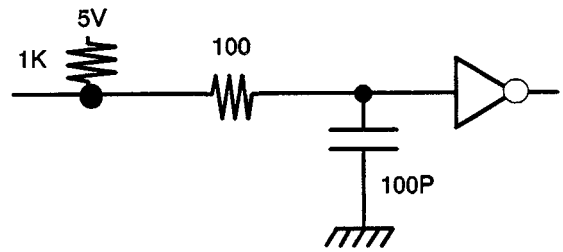
SN74LS244 or suitable articles

$\overline{\text{DATA STROBE}}$



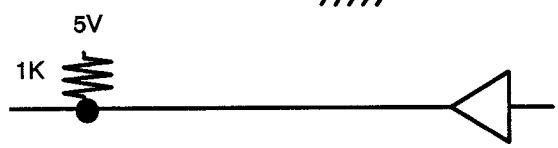
SN74LS240 or suitable articles

$\overline{\text{INPUT PRIME}}$



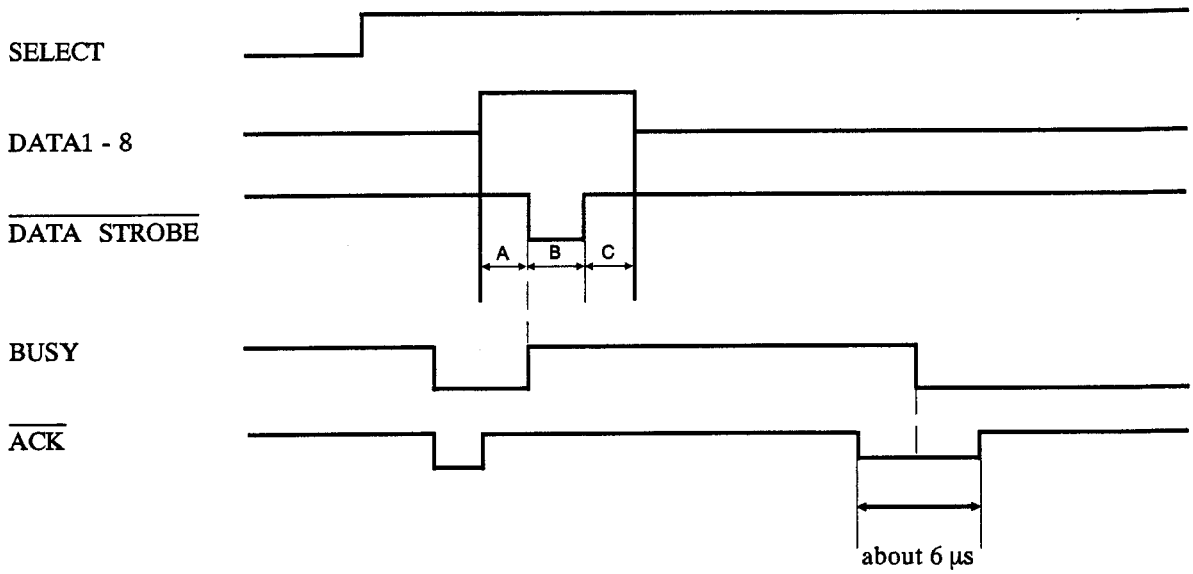
SN74LS240 or suitable articles

Output Circuit



SN7407 or suitable articles

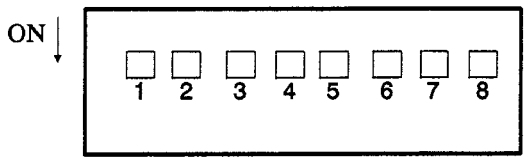
7.1.5 Timing Chart



A: 1 µs (min.) B: 1 µs (min.) C: 1 µs (min.)

7.2 Serial Interface

RS-232C / RS-422A
RS-232C or RS-422A is selected by Dip Switch near interface connector.



Dip SW		Down (ON)	UP (OFF)
1	US/EU Select	US	EU
2 - 3	No use	-	-
4	I/F Select.	RS-422A	RS-232C
5	+5 Output (25 Pin)	5V	NC
6 - 7	I / F Select.	RS-422A	RS-232C
8	I / F Select	RS-232C	RS-422A

7.2.1 Connector

25 Pins Connector
DB-25SA or equivalent.

7.2.2 Signal Function

Pin No.	Signal Name	232C	422A	IN / OUT	Description
1	Frame Ground	*	*	--	Frame Ground.
2	Transmit Data	*		OUT	Transmit data to host.
3	Received Data	*		IN	Received data from host.
3	Received Data (invert)		*	IN	Received data from host.
4	Request to Send	*		OUT	This signal is HIGH when unit is Power ON.
5	Clear to Send	*		IN	Ready status for host to received data.
6	Data Set Ready	*		IN	Host is ready to send/receive data.
7	Signal Ground	*	*	--	Signal Ground.
9	Send Data (invert)		*	OUT	Send data to host.
10	Send Data (non-invert)		*	OUT	Send data to host.
18	Received Data (non-invert)		*	IN	Received data from host.
20	Data Terminal Ready	*		OUT	Data terminal ready for printer.
25	+5V DC	*	*	--	Max. 300mA
8,9 11 - 17 21 - 24					Not defined.

Note: If Dip SW Pin No. 5 is ON the printer out put +5V on 25 Pin connector's Pin No.25.

RS-232C

Signals

a)	FG	Frame Ground . Ground line for circuit protection.
b)	TD	Transmit Data . Transmission line on which a handshaking control character X-ON/X-OFF is output to the host computer.
c)	RD	Received Data . Transmission line on which print data is input from the host computer.
d)	RTS	Request to send . Output signal from the printer which goes HIGH when the printer power is turned on.
e)	CTS	Clear to Send . The serial interface monitors this signal only when you select the XON/XOFF protocol. CTS must be high for the serial interface to transmit data. However, it is not used by this machine which is LaserJet compatible.
f)	DSR	Data Set Ready . This signal makes the receive data valid when High, and invalid when low. However, it is not used by this machine which is LaserJet compatible.
g)	SG	Signal Ground . Signal ground line.
h)	DTR	Data Terminal Ready . In Ready/Busy Protocol mode, the signal goes HIGH when the printer is Ready, and LOW when Busy. (The High and LOW states can be inverted by means of the Function Menu.)
i)	+5V	. Not signal but a +5V power supply output which provides a maximum current of 300mA.

RS-422A

Signals

a)	FG	Frame Ground . Ground line for circuit protection.
b)	SD+ / SD-	Transmit Data . Transmission line on which a handshaking control character X-ON/X-OFF is output to the host computer.
c)	RD+ / RD-	Received Data . Transmission line on which print data from the host computer is input.
d)	SG	Signal Ground . Signal ground line.
e)	+5V	. Not signal but a + 5V power supply output which provides a maximum current of 100mA.

Protocol
This RS-422A permits the X-ON / X-OFF protocol only.

7.2.3 Transmission Procedures

1) READY / BUSY Protocol

This Protocol informs the host of READY/BUSY condition by using the DTR signal line. Using the DTR signal line, it informs READY/BUSY condition for transmission to the host. When the printer is ready to receive data, it makes the DTR signal H level to notice READY condition. When the printer is not ready to receive data, it makes the DTR signal L level, to notice BUSY condition. Under the BUSY condition, sent data may not be printed.

2) Xon / Xoff Method

When printer is ready to receive data, it informs ready condition to the host by sending Xon (11 hex.) data through TD (RS-232C) or SD+ and SD-(RS422A) signal line. Under ON setting of ROBUST-Xon, if data are not sent from the host more than 1 second after the Xon signal is sent, the printer sends Xon signal at interval of 1 second.

When printer becomes data unreceivable condition, it informs busy condition to the host by sending Xoff (13 hex.) data through TD (RS-232C) or SD+ and SD-(RS422A) signal line. In case the host sends data to printer even though the printer is busy due to bufferful, the printer sends Xoff to the host at every data.

Note: Conditions that printer is data receivable are:

. OFF LINE condition is changed to ON LINE condition by pressing ON LINE key.
. Under ON LINE condition, in case the data is full, capacity of data in databuffer becomes less than value of overrunbuffer set by function/menu by processing the data.

Conditions that printer is data unreceivable are:

. ON LINE key is pressed under ON LINE condition or it becomes OFF LINE condition due to error.
. Under ON LINE condition, empty capacity in data buffer becomes less than value of overrun buffer.

7.2.4 Signal Level

1) RS-232C

V_H = 2.2 - 12V
V_L = -12 - 1.4V

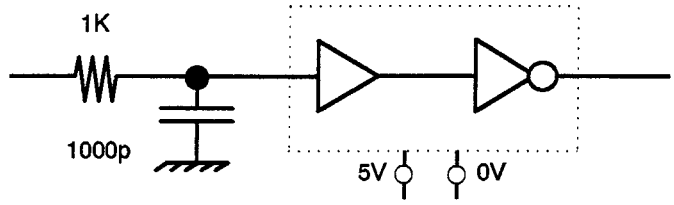
2) RS-422A

V_H = 2.5 - 5 V
V_L = 0 - 0.5 V

7.2.5 Input / Output Circuit

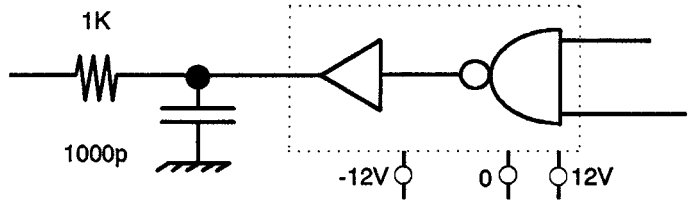
1) RS-232C

Input Circuit



MC145407 or suitable articles

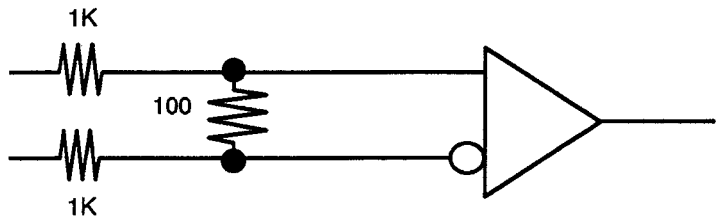
Output Circuit



MC145407 or suitable articles

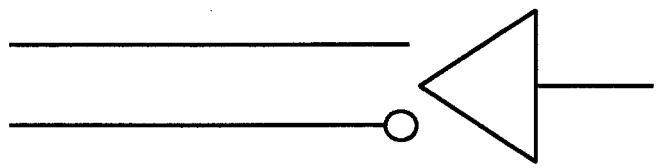
2) RS-422A

Input Circuit



26LS32 or suitable articles

Output Circuit

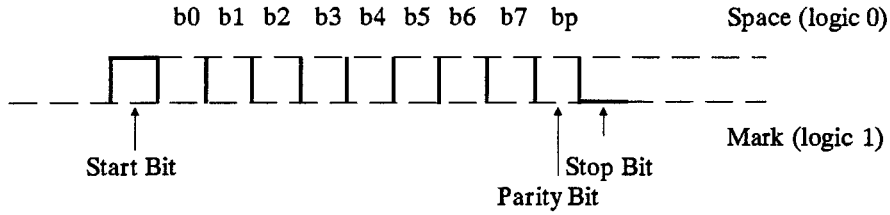


26LS31 or suitable articles

7.2.6 Data Format

Can be slected by Function / Menu.

7 or 8 Data Bit.



. Start Bit	1 bit	
. Data Length	7 or 8 bits	
. Parity Bit	0 or 1 bit	(Non, Odd, Even, Ignore)
. Stop Bit	1 bit or more	

7.2.7 Transmission Speed

Can be selected by Function/Menu

19200, 9600, 4800, 2400, 1200, 600, 300 bps

8. Accessory

Toner single pack	**: NMS 1022**	**8622 520 22009**
Toner dual pack	**: NMS 1024**	**8622 520 24009**
Drum kit	**: NMS 1036**	**8622 520 36009**
Ozone filter	**: NMS 1100**	**8622 521 00009**
2nd paper BIN A4	**: NMS 1071**	**8622 520 71009**
2nd paper BIN LTR	**: NMS 1073**	**8622 520 73009**
Paper cassette A4	**: NMS 1075**	**8622 520 75009**
Paper cassette LTR	**: NMS 1077**	**8622 520 77009**
Face-up tray	**: NMS 1070**	**8622 520 70009**
Memory 1 Mbyte	**: NMS 1049**	**8622 520 49009**
Diablo 630	**: NMS 1091**	**8622 520 91009**
PDL option	**: NMS 1096**	**8622 520 96009**
Epson FX-850	**: NMS 1092**	**8622 520 92009**
IBM Pro XL	**: NMS 1093**	**8622 520 93009**
IBM Pro XL24	**: NMS 1094**	**8622 520 94009**
HPGL 7475A	**: NMS 1095**	**8622 520 95009**

9. Appendix

Appendix1: Character Table

Roman - 8 Character Set
8-bit character = [b8 b7 b6 b5 b4 b3 b2 b1]

HEX CODE	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00			SP	0	@	P	`	p				—	â	Å	Á	Þ
01			!	1	A	Q	a	q			À	Ý	ê	î	Ã	þ
02			"	2	B	R	b	r			Â	ý	ô	Ø	ã	•
03			#	3	C	S	c	s			È	°	û	Æ	Ð	µ
04			$	4	D	T	d	t			Ê	Ç	á	å	ð	¶
05			%	5	E	U	e	u			Ë	ç	é	í	ſ	¾
06			&	6	F	V	f	v			Î	Ñ	ó	ø	Ì	—
07			'	7	G	W	g	w			Ï	ñ	ú	æ	Ó	¼
08			(	8	H	X	h	x			´	¡	à	Ä	Ò	½
09			)	9	I	Y	i	y			`	¿	è	ì	Õ	ª
0A			*	:	J	Z	j	z			^	¤	ò	Ö	õ	º
0B			+	;	K	[	k	{			¨	£	ù	Ü	Š	«
0C			,	<	L	\	l	|			~	¥	ä	É	š	■
0D			-	=	M	]	m	}			Ù	§	ë	ï	Ú	»
0E			.	>	N	^	n	~			Û	ƒ	ö	ß	Ÿ	±
0F			/	?	O	_	o	■			£	¢	ü	Ô	ÿ	

Appendix 2: Emulation Command List

1. HP LaserJet IIP Emulation

CONTROL CODE	FUNCTION
BEL	Bell
BS	Backspace
HT	Horizontal Tab
LF	Line Space
FF	Form Feed
CR	Carriage Return
SO	Shift Out
SI	Shift In
ESC	Escape
SP	Space
ESC E	Printer Reset
ESC &l#X	Number of Copies
ESC &l#H	Paper Source
ESC &l#A	Page Size
ESC &l#P	Page Length
ESC &l#E	Top Margin
ESC &l#F	Text Length
ESC &a#L	Left Margin
ESC &a#M	Right Margin
ESC 9	Clear Horizontal Margins
ESC &l#L	Perforation Region
ESC &k#H	Horizontal Motion Index
ESC &l#C	Vertical Motion Index
ESC &l#D	Line Space
ESC &a#C	Horizontal Cursor Position (Column)
ESC &a#H	Horizontal Cursor Position (Decipoint)
ESC *p#X	Horizontal Cursor Position (Dot)
ESC &a#R	Vertical Cursor Position (Row)
ESC &a#V	Vertical Cursor Position (Decipoint)
ESC *p#Y	Vertical Cursor Position (Dot)
ESC =	Half Line Feed
ESC &k#G	Line Termination
ESC &f#S	Push/Pop Cursor Position
ESC &l#O	Orientation
ESC (ID	Font Symbol Set (Primary)
ESC)ID	Font Symbol Set (Secondary)
ESC (s#P	Font Spacing (Primary)
ESC)s#P	Font Spacing (Secondary)

CONTROL CODE	FUNCTION
ESC (s#H	Font Pitch (Primary)
ESC)s#H	Font Pitch (Secondary)
ESC (s#V	Font Height (Primary)
ESC)s#V	Font Height (Secondary)
ESC (s#S	Font Style (Primary)
ESC)s#S	Font Style (Secondary)
ESC (s#B	Font Stroke Weight (Primary)
ESC)s#B	Font Stroke Weight (Secondary)
ESC (s#T	Font Typeface (Primary)
ESC)s#T	Font Typeface (Secondary)
ESC &k#S	Font Pitch
ESC (#@	Default Primary Font
ESC)#@	Default Secondary Font
ESC &p#X [data]	Transparent Print Data
ESC &d0D	Underline Command
ESC &d3D	Underline Floating Position
ESC &d@	Disable Underline
ESC *c#D	Assign Font ID
ESC *c#F	Font Control
ESC (#X	Font Selection by ID (Primary)
ESC)#X	Font Selection by ID (Secondary)
ESC)s#W [data]	Font Descriptor Command
ESC (s#W [data]	Download Character
ESC *c#E	Character Code
ESC *t#R	Raster Graphics Resolution
ESC *r#A	Start Raster Graphics
ESC *b#W [data]	Transfer Raster Data
ESC *rB	End Raster Graphics
ESC *c#H	Horizontal Rectangle Size (Decipoint)
ESC *c#A	Horizontal Rectangle Size (Dot)
ESC *c#V	Vertical Rectangle Size (Decipoint)
ESC *c#B	Vertical Rectangle Size (Dot)
ESC *c#G	Area Fill ID
ESC *c#P	Fill Rectangular Area
ESC &f#Y	Macro ID
ESC &f#X	Macro Control
ESC &s#C	End of Line Wrap
ESC Y	Enables Display Function Mode
ESC Z	Disable Display Function Mode
ESC z	Test Print
ESC *r#F	Raster Graphics Presentation Mode
ESC *b#M	Raster Compression
ESC &l#U	Long-edge offset Registration
ESC &l#Z	Short-edge offset Registration
ESC FS n	Set Emulations

2. Diablo 630 Emulation Command:
   See the Diablo 630 Emulation Control Codes (PAA-386)

3. Epson FX-850 Emulation Command:
   See the Epson FX-850 Emulation Control Codes (PAA-549)

4. IBM Proprinter XL Emulation Command:
   See the IBM Proprinter XL Emulation Control Codes (PAA-387)

5. IBM Proprinter XL-24e Emulation Command:
   See the IBM Proprinter XL-24e Emulation Control Codes (PAA-530)

6. HPGL Emulation Command:
   See the HP 7475A Graphics Plotter (HP-GL) Emulation Control Codes (PAA-442)

7. PDL Emulation Operators:
   See the PDL Emulation Operators (PAA-415)

Appendix3: Guideline of the NMS1474 for Special Paper

PHILIPS cannot assure and recommend you the NMS1474 in case of using the special paper, because it depend on the Paper Company. So we will show you a guideline for using the special paper based on the information of Test at PHILIPS.

1) Emvelope

   1-1) Condition for envelope

   Thermal fixing method is adopted in the PHILIPS laser printer. At the condition of high temperature (200 °C, 1 sec.) and pressurization (500 - 800 gf/cm^2), you should prevent burning and melting the paste used in the envelope, when the paper pass through the printer. Any crumble, owing to a fold or overlap of envelope, and moisture absorption should not be occured at the process of production, transport and maintenance. Above all, you should select a envelope suited for this laser printer, after making a sample test.

   1-2) Envelop suitable for PHILIPS laser printer, as a result of the Test at PHILIPS
   Excutive Style 10116 Wasta vaco (USA).

2) Label Paper

   2-1) Condition for Label Paper

   Label Paper consists of the printing side, the adhesive and carrier sheet. Label Paper should not wind around the sensitive drum or feed roller. Threfore, any space between each lebel should not exist on the carrier sheet. And a part of label should not be torn off, nor rolled up by itself. The label must be stuck to whole carrier sheet. Still more, paste should not melt nor be pressed out at the condition of high temperature (200°C, 1 sec.) and pressurization (500 - 800gf/cm^2) in the thermal fixing equipment.

   2-2) Label paper suitable for PHILIPS laser printer, as a results of the Test at PHILIPS.

   Avery Lasergraphic Label (USA)

3) Transparency (OHP manuscript)

3-1) Condition for Transparency

At the condition of high temperature (200 ^{o} C, 1 sec.) and pressurization (500 - 800 gf/cm^{2}), they should not be melted nor curled extremely. The cutting phase in the film should be proportional to the cutting paper in accuracy.

3-2) Transparency suitable for PHILIPS laser printer, result of the Test PHILIPS.

XEROX FILM _____ FUJI XEROX
3M Trans parency film for Laser Printers

4) Miscellaneous

4-1) When you use the printed paper or colored paper, it must not be susceptible to influence from silicon oil, which is used in the temperature, pressurization and its roller.

4-2) Even if the paper size or weight may comply with the specification, any trouble, such as paper jam will probably occur in the picture according to the condition (thickness, roughness of the surface, precision in cutting, paper's ingredient, electric resistance, maintenance etc.). By all means, we advice you to select the paper suitable for PHILIPS laser printer, after making a sample test.

Appendix 4: LCD message in five languages

The Following tables show the messages in five languages indicated on NMS1474 LCD.

NMS1474 Panel Message
PRINTER ERROR STATUS INDICATION 1/2

U.S	FRENCH	GERMAN
ON-LINE LTR	EN LIGNE LTR	BEREIT LTR
ON-LINE LEG	EN LIGNE LEG	BEREIT LEG
ON-LINE A4	EN LIGNE A4	BEREIT A4
ON-LINE B5	EN LIGNE B5	BEREIT B5
ON-LINE EXE	EN LIGNE EXE	BEREITEXE
OFF-LINE LTR	HORS LIGNE LTR	NIC. BEREIT LTR
OFF-LINE LEG	HORS LIGNE LEG	NIC.BEREIT LEG
OFF-LINE A4	HORS LIGNE A4	NIC.BEREIT A4
OFF-LINE B5	HORSLIGNE B5	NIC.BEREIT B5
OFF-LINE EXE	HORSLIGNE EXE	NIC.BEREIT EXE
WAIT	ATTEMDRE	WARTEN
INITIALIZE	INITIALISATION	INITIALISIEREN
FONTPRINT	IMPRESSFONTE	FONTDRUCK
STATUSPRINT	STATUTIMPRESS	STATUSDRUCK
SELFTEST	AUTOTEST	SELBSTTEST
PUSH F.F KEY	APPUYERSURFF	FFDRUECKEN
MENURESET	MENURESET	MENURESET
DATAEXIST	DONNEEEXISTANTE	DATENEXISTIEREN
HEXDUMP	HEXDUMP	HEXDUMP
COVEROPEN	CAPOTOUVERT	DECKELOPPEN
PAPERJAM	BOURRAGEPAPIER	PAPIERSTAU
INSERTIONERROR	ERR.INSER.PAPIER	EINZUGFEHLER
PAPEREMPTY	BACPAPIERVIDE	PAP.NACHFULLEN
TONEREMPTY	CART.ENCREVIDE	TONERNACHFULLEN
CHANGEDRUM	CHANGERTAMBOUR	TROMMELWECHSELN
PAPERSIZEERROR	ERR.FORM.PAPIER	PAP-FORMATFEHLER
FONTCARTERROR	ERR.CART.FONTE	FONTKAS.FEHLER
CPUERROR	ERR.CPU	PROZESSORFEHLER
ERROR	ERREUR	FEHLER
FONTCARTLEFT	CARACTFONTELEF	FONTKAS.LEFT
FONTCARTRIGHT	CARACTFONTERIG	FONTKAS.RIGHT
FONTCARTBOTH	CARACTFONTEBOT	FONTKAS.BOTH
LOADLTR	CHARGEMENTLTR	LADENLTR
LOAD LEG	CHARGEMENTLEG	LADENLEG
LOAD A4	CHARGEMENTA4	LADEN A4
LOAD B5	CHARGEMENTB5	LADEN B5
LOAD EXE	CHARGEMENTEXE	LADENEXE
LOAD MONARCH	CHARGEMENTMONAR	LADENMONARCH
LOAD C5	CHARGEMENT C5	LADEN C5
LOAD DL	CHARGEMENTDL	LADENDL
LOAD COM-10	CHARGEMENTCOM10	LADENCOM-10

ITALIAN	SPANISH
IN LINEA LTR	ON-LINE CRT
IN LINEA LEG	ON-LINE LEG
IN LINEA A4	ON-LINE A4
IN LINEA B5	ON-LINE B5
IN LINEA EXE	ON-LINE EJE
NO IN LINEA LTR	OFF-LINE CRT
NO IN LINEA LEG	OFF-LINE LEG
NO IN LINEA A4	OFF-LINE A4
NO IN LINEA B5	OFF-LINE B5
NO IN LINEA EXE	OFF-LINE EJE
ATTENDERE	ESPERAR
INIZIALIZZAZIONE	INICIALIZAR
STAMPAFONT	IMPRIMIRFONT
STAMPASTATO	IMPRIMIRESTADO
AUTOTEST	TESTAUTO
PREMEREFF	PULSEFF
MENURESET	RESETMENUE
PRESENZADATI	EXISTENDATOS
HEXDUMP	DUMPHEX
COPERCHIOAPERTO	TAPAABIERTA
CARTAINCEPPATA	ATASCOPAPEL
ERRORE ALIMENTAZ	ERRORINSECION
FINECARTA	PAPELGOTADO
FINETONER	TONERGOTADO
CAMBIARETAMBURO	CAMBIARTAMBOR
FORMATOERRATO	ERRORFORMATO
ERROREFONTCART	ERRORFORMATO
ERROREDICPU	ERRORCPU
ERRORE	ERROR
FONTECARTLEFT	IZQ. FONTCART
FONTECARTRIGHT	DRC. FONTCART
FONTECARTBOTH	DOS. FONTCART
CAMBIACARTALTR	CARGARCRT
CAMBIACARTALEG	CARGARLEG
CAMBIA CARTA A4	CARGAR A4
CAMBIACARTAB5	CARGARB5
CAMBIACARTAEXE	CARGAREJE
CAMBIACARTAMON	CARGARMONARCH
CAMBIACARTAC5	CARGARC5
CAMBIACARTADL	CARGARDL
CAMBIACARTACOM	CARGARCOM-10

FUNCTION / MENU / INDICATION

U.S.	FRENCH	GERMAN	ITALIAN	SPANISH
DIRECTRY=	CATHALOG.=	VERZEICH.=	LISTA=	DIRECTR.=
MAIN	MAIN	HAUPT	PRINCIPAL	BASE
I/F	I/F	I/F	I/F	I/F
HPLJ	HPLJ	HPLJ	HPLJ	HPLJ
DI630	DI630	DI630	DI630	DI630
EPSON	EPSON	EPSON	EPSON	EPSON
IBM	IBM	IBM	IBM	IBM
HPGL	HPGL	HPGL	HPGL	HPGL
PDL	PDL	PDL	PDL	PDL

U.S.	FRENCH	GERMAN
PAPER SET= LTR * LEG A4 B5 EXE	FORMAT PAP.= LTR * LEG A4 B5 EXE	PAP. FORMAT= LTR * LEG A4 B5 EXE
COPIES= 01 * 99	COPIES= 01 * 99	KOPIEN= 01 * 99
MANUAL FEED= OFF * ON	MANUEL= OFF * ON	MANU. ZUFUHR= AUS * EIN
THICK PAPER= OFF * ON	EPAIS.PAP.= OFF * ON	DICKES PAP.= AUS * EIN
AUTO CONT= OFF * ON	CONT.AUTOM.= OFF * ON	WEITER= AUS * EIN
TRAY= 2nd ONLY * 2nd MC	TRAY= 2nd ONLY * 2nd MC	TRAY= 2nd ONLY * 2nd MC
2nd SIZE= LTR * A4	2nd SIZE= LTR * A4	2nd SIZE= LTR * A4
EMULAT= HPLJ * DI630 EPSON IBM HPGL PDL	EMULATION= HPLJ * DI630 EPSON IBM HPGL PDL	EMULATION= HPLJ * DI630 EPSON IBM HPGL PDL
STATUS PRT= ON OFF *	ETAT IMPR= ON OFF *	STAT. DRUCK= EIN AUS *
POWERON= ONLINE * OFFLINE	MARCHE= OFF * ON	NET.EIN= AUS * EIN
DATA BUFFER= 01 02 * 99	MEM.TAMPON= 01 02 * 99	DATEN PUFFER= 01 02 * 99

ITALIAN	SPANISH
FORMATO= LTR * LEG A4 B5 EXE	FORMATO= CRT * LEG A4 B5 EJE
NR COPIE= 01 * 99	COPIAS= 01 * 99
ALIM. A MANO= OFF * ON	INS. MANUAL= NO * SI
CARTA SPES.= OFF * ON	PAPEL GRUESO= NO * SI
CONTINUA= OFF * ON	CONT. AUTO= NO * SI
TRAY= 2nd ONLY * 2nd MC BOTH	TRAY= 2nd ONLY * 2nd MC BOTH
2nd SIZE= LTR * A4	2nd SIZE= LTR * A4
EMULAZ.= HPLJ * DI630 EPSON IBM HPGL PDL	EMULACION= HPLJ * DI630 EPSON IBM HPGL PDL
STAMPA CONF= ON OFF *	IMP. ESTADO= SI NO *
ACCENSIONE= OFF * ON	ENCEND.= ONLINE * OFFLINE
BUFFER DATI= 01 02 * 99	BUFFER DATOS= 01 02 * 99

U.S.	FRENCH	GERMAN	ITALIAN	SPANISH
OVER LOAD= 01 10 * 40	SURCHARGE= 01 10 * 40	UEBERLAUF= 01 10 * 40	BUFFER PIENO= 01 10 * 40	SOBR CARGA= 01 10 * 40
TIME OUT= OFF * ON	HORS TEMPS= OFF * ON	AUSZEIT= AUS * EIN	FINE TEMPO= OFF * ON	FIN PLAZO= NO * SI
TIMER= 01 30 * 90	HORLOGE= 01 30 * 90	TIMER= 01 30 * 90	TIMER= 01 30 * 90	CONTADOR= 01 30 * 90
INDICAT= US * FR GE IT SP	INDICAT= US * FR GE IT SP	INDICAT= US * FR GE IT SP	INDICAT= US * FR GE IT SP	INDICAT= US * FR GE IT SP

U.S.		FRENCH		GERMAN	
I/F=	PARALLEL* RS-232C RS-422A	I/F=	PARALLELE* RS-232C RS-422A	I/F=	PARALLEL* RS-232C RS-422A
BAUD RATE=	300 600 1200 2400 4800 9600 * 19200	VITESSE=	300 600 1200 2400 4800 9600 * 19200	DATENRATE=	300 600 1200 2400 4800 9600 * 19200
PROT=	RDY/BSY(H) * RDY/BSY(L) XON/XOFF	PROT=	RDY/BSY(H)* RDY/BSY(L) * XON/XOFF	PROT=	RDY/BSY(H) * RDY/BSY(L) XON/XOFF
DATA BIT=	8 * 7	BITS DONNEES=	8 * 7	DATEN BITS=	8 * 7
PARITY=	NONE * ODD EVEN IGNORE	PARITE=	SANS * IMPAIRE PAIRE IGNOREE	PARITAT=	KEINE * UNGER. GERADE IGNORE
STOP BIT=	1 * 2	BIT STOP=	1 * 2	STOP BIT=	1 * 2
ROBUST-XON=	ON * OFF	ROBUST-XON=	ON * OFF	ROBUST-XON=	EIN * AUS

ITALIAN		SPANISH	
I/F=	PARALLELO* RS-232C RS-422A	I/F=	PARALELO* RS-232C RS-422A
BAUD RATE=	300 600 1200 4800 9600 * 19200	VELOCIDAD=	300 600 1200 4800 9600 * 19200
PROT=	RDY/BSY(H) * RDY/BSY(L) XON/XOFF	PROT=	RDY/BSY(H) * RDY/BSY(L) XON/XOFF
LUNG. DATO=	8 * 7	BITS DATOS=	8 * 7
PARITA=	NONA * DISPARI PARI IGNORA	PARIDAD=	NO * IMPAR PAR IGNORAR
BIT DI STOP=	1 * 2	BITS STOP=	1 * 2
XON-RIPET.=	ON * OFF	ROBUST-XON=	SI * NO

U.S.		FRENCH		GERMAN	
FONT SOURCE=	I * L R S	SOURCE FONTE=	I * L R S	FONT QUELLE=	I * L R S
FONT NUMBER=	000 * n	NUMERO FONT=	000 * n	FONT NUMMER=	000 * n
ORIENTATE=	PORT * LAND	ORIENT=	PORTRAIT* PAYSAGE	ORIENT.=	HOCH QUER
FORM=	005 060 * 064 128	LONG. TEXTE=	005 060 * 064 128	FORMULAR=	005 060 * 064 128
SYMBOL=	ROMAN8 * ECMA-94 IBM-US IBM-DN PC-850 ISO 2 ISO 4 ISO 6 ISO 10 ISO 11 ISO 14 ISO 15 ISO 16 ISO 17 ISO 21 ISO 25 ISO 57 ISO 60 ISO 61 ISO 69 ISO 84 ISO 85 GERMAN SPANISH	SYMBOLE=	ROMAN8 * ECMA-94 IBM-US IBM-DN PC-850 ISO 2 ISO 4 ISO 6 ISO 10 ISO 11 ISO 14 ISO 15 ISO 16 ISO 17 ISO 21 ISO 25 ISO 57 ISO 60 ISO 61 ISO 69 ISO 84 ISO 85 GERMAN SPANISH	SYMBOL=	ROMAN8 * ECMA-94 IBM-US IBM-DN PC-850 ISO 2 ISO 4 ISO 6 ISO 10 ISO 11 ISO 14 ISO 15 ISO 16 ISO 17 ISO 21 ISO 25 ISO 57 ISO 60 ISO 61 ISO 69 ISO 84 ISO 85 GERMAN SPANISH

ITALIAN		SPANISH	
SORGE. FONT=	I * L R S	FONT FUENTE=	INT * IZQ DRC SOF
NUMERO FONT=	000 n *	NUMERO FONT=	000 n
ORIENT.=	PORT. * LAND.	ORIENTAR=	RETR. * APSD.
FORMATO=	005 060 * 064 128	FORMA=	005 060 * 064 128
SYMBOLO=	ROMAN8 * ECMA-94 IBM-US IBM-DN PC-850 ISO 2 ISO 4 ISO 6 ISO 10 ISO 11 ISO 14 ISO 15 ISO 16 ISO 17 ISO 21 ISO 25 ISO 57 ISO 60 ISO 61 ISO 69 ISO 84 ISO 85 GERMAN SPANISH	SIMBOLO=	ROMAN8 * ECMA-94 IBM-US IBM-DN PC-850 ISO 2 ISO 4 ISO 6 ISO 10 ISO 11 ISO 14 ISO 15 ISO 16 ISO 17 ISO 21 ISO 25 ISO 57 ISO 60 ISO 61 ISO 69 ISO 84 ISO 85 ALEMAN. ESPANOL

U.S.		FRENCH		GERMAN	
FONT SOURCE=	I * L R S	SOURCE FONTE=	I * L R S	FONT QUELLE=	I * L R S
FONT NUMBER=	000 * n	NUMERO FONT=	000 * n	FONT NUMMER=	000 * n
ORIENTATE=	PORT * LAND	ORIENT=	PORTRAIT* PAYSAGE	ORIENT.=	HOCH * QUER
SYMBOL=	ROMAN8 * ECMA-94 IBM-US IBM-DN PC-850 ISO 2 ISO 4 ISO 6 ISO 10 ISO 11 ISO 14 ISO 15 ISO 16 ISO 17 ISO 21 ISO 25 ISO 57 ISO 60 ISO 61 ISO 69 ISO 84 ISO 85 GERMAN SPANISH	SYMBOLE=	ROMAN8 * ECMA-94 IBM-US IBM-DN PC-850 ISO 2 ISO 4 ISO 6 ISO 10 ISO 11 ISO 14 ISO 15 ISO 16 ISO 17 ISO 21 ISO 25 ISO 57 ISO 60 ISO 61 ISO 69 ISO 84 ISO 85 GERMAN SPANISH1	SYMBOL=	ROMAN8 * ECMA-94 IBM-US IBM-DN PC-850 ISO 2 ISO 4 ISO 6 ISO 10 ISO 11 ISO 14 ISO 15 ISO 16 ISO 17 ISO 21 ISO 25 ISO 57 ISO 60 ISO 61 ISO 69 ISO 84 ISO 85 GERMAN SPANISH
SPACE=	10CPI* 12CPI* 15CPI PS	ESPASE=	10CPI* 12CPI 15CPI PS	ABSTAND=	10CPI* 12CPI 15CPI PS
SKIP-OVER=	NONE 1"*	SAUT PAGE=	SANS 1"*	PRF. STR.=	KEIN 1"*
AUTO LF=	CR+LF CR*	AUTO LF=	CR+LF CR*	AUTO LF=	CR+LF CR*
AUTO CR=	LF+CR LF*	AUTO CR=	LF+CR LF*	AUTO CR=	LF+CR LF*
TOP OF FORM=	0 3* 12	MARGE HAUTE=	0 3* 12	OBERER RAND=	0 3* 12

ITALIAN		SPANISH	
SORGE. FONT=	I* L R S	FONT FUENTE=	INT IZQ DRC SOF
NUMERO FONT=	000* n	NUMERO=	000* n
ORIENT.=	PORT.* LAND.	ORIENTAR=	RETR.* APSD.
SYMBOLO=	ROMAN8* ECMA-94 IBM-US IBM-DN PC-850 ISO 2 ISO 4 ISO 6 ISO 10 ISO 11 ISO 14 ISO 15 ISO 16 ISO 17 ISO 21 ISO 25 ISO 57 ISO 60 ISO 61 ISO 69 ISO 84 ISO 85 GERMAN SPANISH	SIMBOLO=	ROMAN8* ECMA-94 IBM-US IBM-DN PC-850 ISO 2 ISO 4 ISO 6 ISO 10 ISO 11 ISO 14 ISO 15 IOS 16 ISO 17 ISO 21 ISO 25 ISO 57 ISO 60 ISO 61 ISO 69 ISO 84 ISO 85 ALEMAN. ESPANOL
SPAZIO=	10 CPI* 12 CPI 15 CPI PS	ESPACIO=	10 CPI* 12 CPI 15 CPI PS
SAL. PAG.=	NONA 1"*	PERFORAC=	NO 1"*
AUTO LF=	CR+LF CR*	LF AUTO=	CR+LF CR*
AUTO CR=	LF+CR LF*	CR AUTO=	LF+CR LF*
TESTATA MOD.=	0 3* 12	MARGEN SUP.=	0 3* 12

U.S.		FRENCH		GERMAN	
ORIENTATE=	PORT* LAND	ORIENT=	PORTRAIT* PAYSAGE	ORIENT.=	HOCH * QUER
CONDENS=	NORMAL* CONDENS	CONDENS=	NORMAL* CONDENS	DICHTE=	NORMAL* DICHTE
ZERO SLASH=	OFF* ON	ZERO=	NON BARRE* BARRE	NULL=	OHNE STR.* MITSTR.
INTL CG=	USA* FRENCH GERMANY UK DENMK1 SWEDEN ITALY SPAIN1 JAPAN NORWAY DENMK2 SPAIN2 LATIN	CONFIG.=	USA* FRANC. ALLEMAG R.U. DANMK1 SUEDE ITALIE ESPGN1 JAPON NORGEGE DANMK2 ESPGN2 LATIN	INTL CG=	USA* FRANKR. DEUTSCH GB DANMK1 SCHWED. ITALIEN SPAN.1 JAPAN NORWEG DANMK2 SPAN.2 LATEIN
SKIP-OVER=	NONE 1"*	SAUT PAGE=	SANS 1"*	PRF. STR.=	KEIN 1"*
AUTO LF=	CR+LF CR*	AUTO LF=	CR+LF CR*	AUTO LF=	CR+LF CR*
CG TABLE=	ITALIC* GRAPH	CARAC=	ITALIQ* GRAPH.	ZEICH.=	KURSIV* GRAPH.
TOP OF FORM=	0 3* 12	MARGE HAUTE=	0 3* 12	OBERER RAND=	0 3* 12

ITALIAN		SPANISH	
ORIENT.=	PORT.* LAND.	ORIENTAR=	RETR.* APSD.
CONDENS=	NORMALE* CONDENS	COMDENSAR=	NORMA* COMDE*
ZERO=	NONBARRATO* BARRATO	CERO=	SIN BARRA* CONBARRA
STATO=	USA* FRANCIA GERMAN. NGHIL. DNMRC 1 SVEZIA ITALIA SPAGNA1 GIAPP. NORVEG. DNMRC 2 SPAGNA2 LATINO	INTL CG=	USA* FRANCES ALEMAN. BRITAN. DANES1 SUECO ITALIA ESPAN.1 JAPON.1 NORUEGA DANES2 ESPAN.2 LATINO
SAL. PAG.=	NONA 1"*	PERFORAC.=	NO 1"*
AUTO LF=	CR+LF CR*	LF AUTO=	CR+LF CR*
FONT=	ITALIC* GRAFIC	TABLA CG=	ITALIC* GRAFIC
TESTATA MOD.=	0 3* 12	MARGENSUP.	0 3* 12

U.S.	FRENCH	GERMAN	ITALIAN	SPANISH
ORIENTATE= PORT * LAND	ORIENT= PORTRAIT* PAYSAGE	ORIENT.= HOCK * QUER	ORIENT.= PORT. * LAND.	ORIENTAR= RETR. * APSD
CHARACTER= SET1 * SET2 SET2'	CARACTERE= JEU1 * JEU2 * JEU2'	ZEICHEN= SATZ1 * SATZ2 SATZ2'	CARAT.= SET1 * SET2 SET2'	CARACT.= JUEGO1 * JUEGO2 JUEGO2'
ZERO SLASH= OFF * ON	ZERO= NON BARRE * BARRE	NULL= OHNE STR. * MITSTR.	ZERO= NONBARRATO* BARRATO	CERO= SIN BARRA * CONBARRA
SKIP-OVER= NONE 1" *	SAUT PAGE= SANS 1" *	PRF. STR.= KEIN 1" *	SAL. PAG.= NONA 1" *	PERFORAC.= NO 1" *
AUTO LF= CR+LF CR *	AUTO LF= CR+LF CR *	AUTO LF= CR+LF CR *	AUTO LF= CR+LF CR *	LF AUTO= CR+LF CR *
AUTO CR= LF+CR LF *	AUTO CR= LF+CR LF *	AUTO CR= LF+CR LF *	AUTO CR= LF+CR LF *	CR AUTO= LF+CR LF *
TOP OF FORM= 0 3 * 12	MARGE HAUTE= 0 3 * 12	OBERER RAND= 0 3 * 12	TESTATA MOD.= 0 3 * 12	MARGEN SUP.= 0 3 * 12
AGM MODE= ON OFF *	AGM MODE= ON OFF *	AGM MODE= EIN AUS *	AGM MODO= ON OFF *	MODO AGM= SI NO *
FONT= US * MULTI	FONTE= US * MULTI	FONT= US * MULTI	FONTE= US * MULTI	FONT= US * MULTI

HP-GL Emulation

U.S.	FRENCH	GERMAN	ITALIAN	SPANISH
SIZE= US A4 * USA3 META4 META3	FORMATO= US A4 * USA3 META4 META3	FORMAT= US A4 * USA3 META4 META3	FORMATO= US A4 * USA3 META4 META3	TAMANO= US A4 * USA3 META4 META3
PEN WIDTH= 1 * 3 5 7	LARGEUR STYLO= 1 * 3 5 7	STRICH BREITE= 1 * 3 5 7	SPESS. PENNA= 1 * 3 5 7	ANCHO PLUMA= 1 * 3 5 7
ROTATION= 0 * 90	ROTATION= 0 * 90	ROTATION= 0 * 90	ROTAZIONE= 0 * 90	ROTACION= 0 * 90

PDL

U.S.	FRENCH	GERMAN	ITALIAN	SPANISH
MODE= BATCH * INTERACT	MODE= BATCH * INTERACTIF	MOD.= STAPEL * INTERAKTIV	MODO= BATCH * INTERATT.	MODO= BATCH * INTERACT

NMS1474
CHAPTER:2- OPERATIONS

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1. Outline

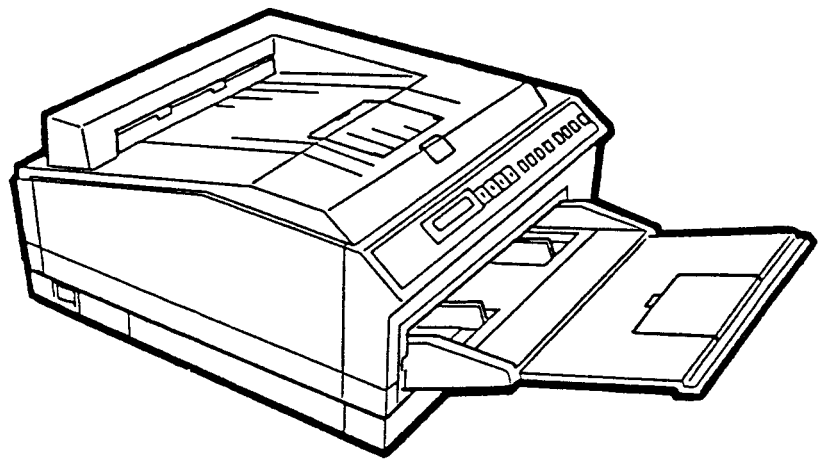


Fig. 2-1 Outline

This NMS1474 printer is a desktop laser page printer operating on dry-process electrophotographic principles.

2. Features

Non-impact

Non-impact techniques using semiconductor laser beam scanning and electro-photographic technology results in low noise and is suitable for use in office environments.

High-quality

High-quality printing can be achieved with 300 DPI resolution for text and graphics.

Easy replacement of consumables

The operator can easily replace the toner cartridge, drum unit and other consumables.

Easy Paper handling

Paper handling has been designed so that face down or face up output can be selected by one touch lever.

Small and lightweight

This printer is designed to be small, lightweight and have a minimum footprint .

Emulation

HP LaserJet IIP (Resident) and 5 kinds of emulation are available as options: Diablo 630, EPSON FX-850, IBM Pproprinter XL/XL24e, HP-GL, and PDL.

Cartridge slot

A cartridge slot is provided to accommodate optional emulation or font cartridges.

Expandable memory

Up to two optional RAM module sets can be added, this allows a full bit-image page to be processed at once.

2nd-bin feeder

An optional 2nd-bin feeder can be installed inside the printer that accommodates up to 300 sheets of paper.

3. External View and Part Names

3.1 External view

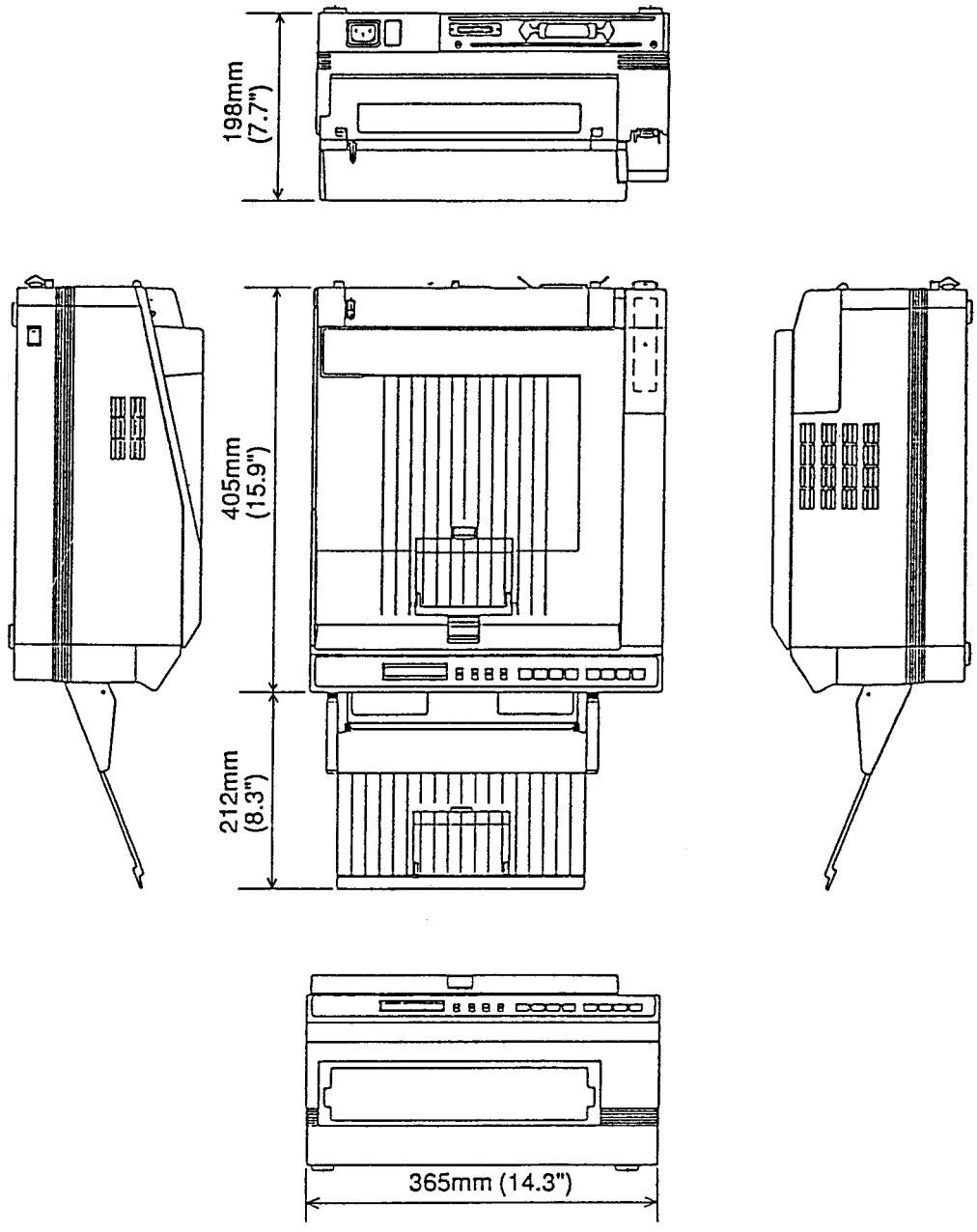


Fig. 2-2 External view

3.2 Part Names

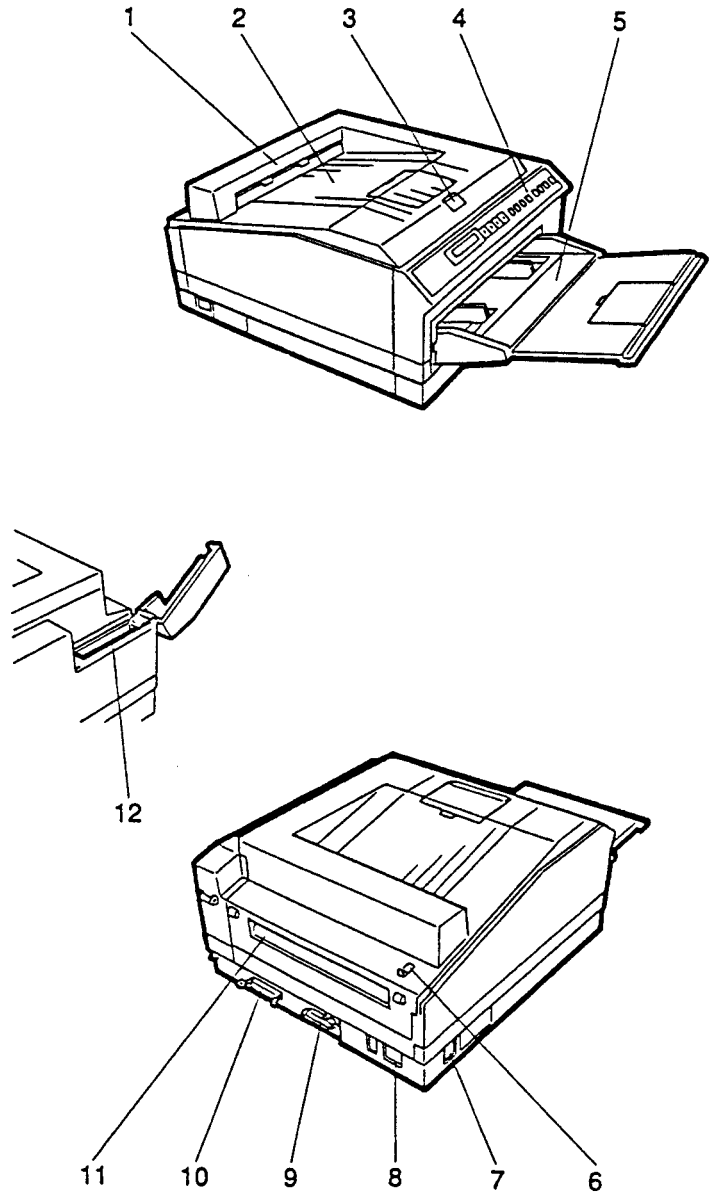


Fig. 2-3 Part names

1	Face-down paper eject outlet	7	Power switch
2	Face-down paper tray	8	Power inlet
3	Release latch	9	Serial I/F connector
4	Operation panel	10	Parallel I/F connector
5	Multi paper cassette	11	Face-up paper eject outlet
6	Paper eject selection lever	12	Font or emulation cartridge slot.

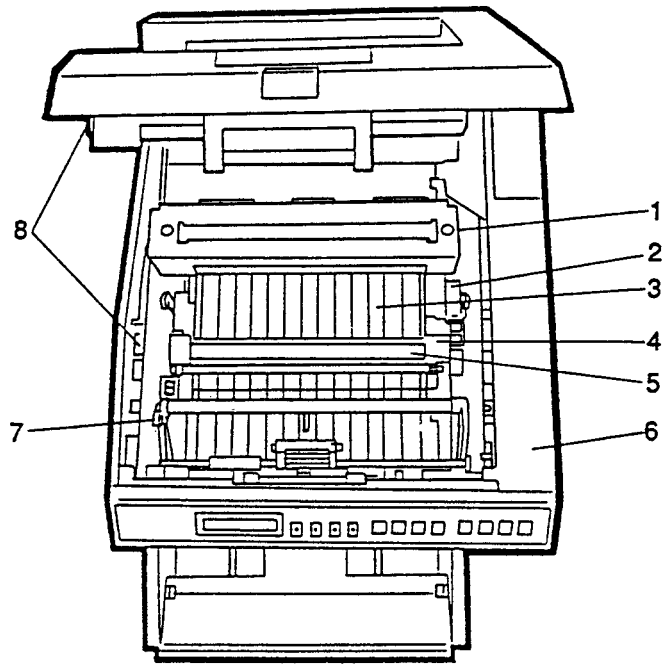


Fig. 2-4 Part names

1	Heater unit	5	Transfer charger
2	Ozone filter	6	Drum counter
3	Paper guide	7	Paper feed release lever
4	Discharger	8	Cover open arm

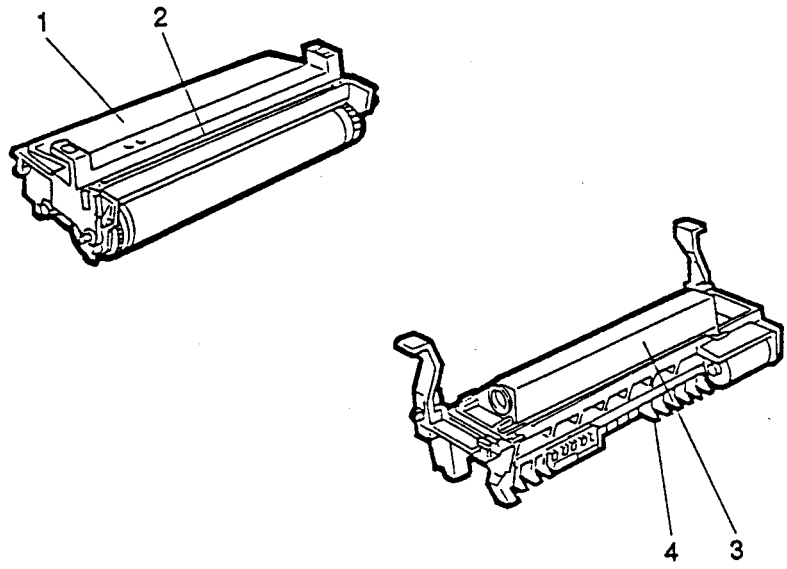


Fig. 2-5 Part names

1 Drum unit
2 Charger
3 Toner cartridge
4 Developer unit

4. Installation

4.1 Usage environment

This printer should be used where the following conditions are satisfied.

A level and stable surface.
The printer power cord is directly connected to a wall outlet.
The printer power supply is adequate.
200V printers: 220V +/-10%, 240V +/-10% 50Hz +/-3Hz

Power supply capacity: 600W (operating)
Adequate ventilation.
Temperature and humidity ranges.
Temperature: 10-35°C (50-95°F)
Humidity: 20-80% RH (no condensation)

Do not use the printer under the following conditions.
Where it is subject to vibration.
Close to heat-generating tools or other heat sources.
Where there is severe temperature fluctuation.
Where it is humid or damp.
When it is subject to direct sunlight.
(If it is unavoidable to install the printer where it will be subject to direct sunlight, shield the printer using a thick curtain etc.)
Where there is large amounts of dust.

Note: Ozone may be generated while the laser printer is in use but the amount will not affect the human body. However, when printing a large number of copies, it is recommended to ventilate the room to keep a comfortable working environment.

4.2 Installation

After selecting an installation location that meets the conditions listed on the previous page, install the printer making sure that there is sufficient space for operation.

The required space is shown below.

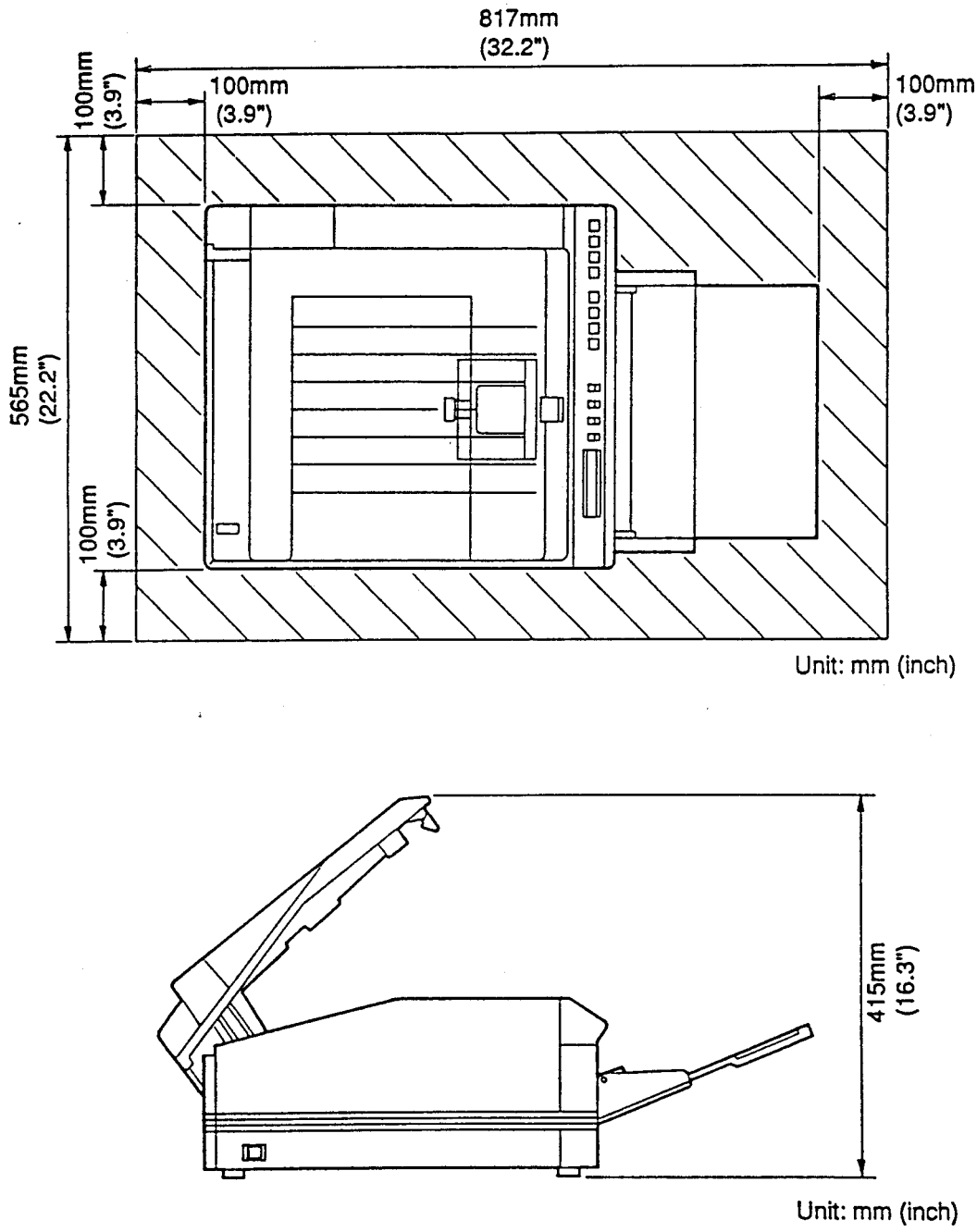
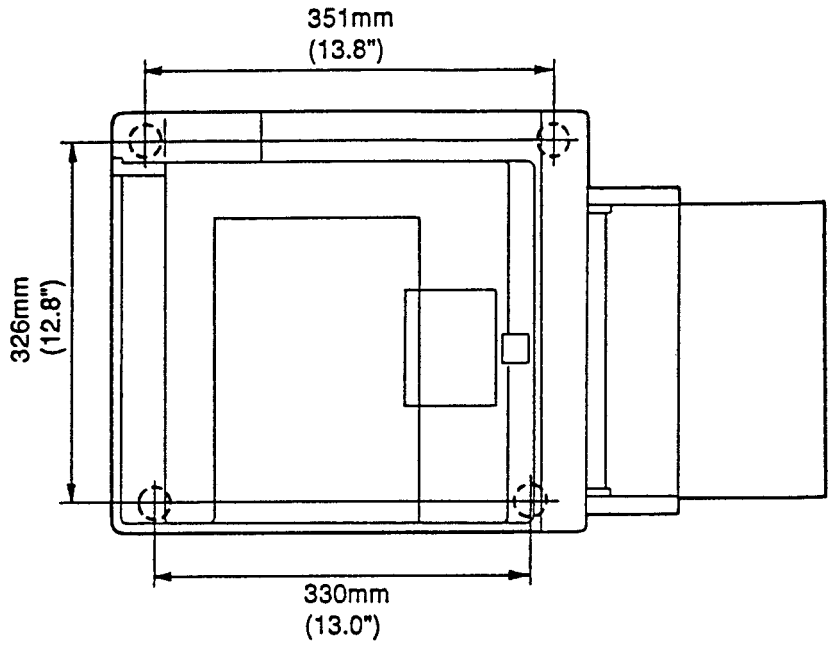


Fig. 2-6 Installation space



Unit: mm (inch)

Fig. 2-7 Installation space

Note: This printer has rubber feet in the positions shown above. Make sure that the stand or desk on which you place the printer is large enough to accommodate all four feet.

4.3 Selecting paper

This printer is capable of printing on transparent sheets and labels as well as on normal paper.

Normal Paper

The paper sizes available in automatic feed mode include Letter, Legal, A4, B5, Executive, COM-10, Monarch, DL and C5. Paper sizes available in manual feed mode range from 82x148mm (3.2"x5.8") to 216x356mm (8.5"x14").

The range of paper weights (basis weights) is given below.

Automatic feed:	60-105g/m2
Manual feed:	60-120g/m2

Recommended Paper

Letter:	Xerox 4024 (75g/m2, 20lbs)
Legal:	Xerox 4024 (75g/m2, 20lbs)
A4:	Fuji Xerox-P (64g/m2, 17lbs)
	NEUSIEDLER (80g/m2, 21.3lbs)
B5:	Fuji Xerox-P (64g/m2, 17lbs)
	NEUSIEDLER (80g/m2, 21.3lbs)
Executive:	Xerox 4024 (75g/m2, 20lbs)

Note: If any paper other than the recommended paper is used, the print quality may not meet specifications.
It may also cause double feed, a paper jam, etc.

WARNING: The use of printed paper can damage the printer due to melted ink. Some kinds of ink may generate gas or the like.

Special Paper

Special paper includes envelopes, transparent sheets, and label sheets. Paper sizes of 82x148mm (3.2x5.8") to 216x356mm (8.5"x14") can be used. Special paper must be inserted in manual feed mode.

WARNING: Before using special paper, be sure to contact your dealer to select the type of paper suitable for this printer. Use of inappropriate paper may result in lower print quality, problems such as paper jam or contamination of the drum due to the glue leaking from label sheet.

Envelopes

This printer uses a heat fixing method. While the envelope passes through the printer at a high temperature (200oC for about one second) and under pressure (500-800gf/cm2) due to the heat fixing unit, the glue used on the envelope must not be burned or melted. Also, there must not be folds made in the course of manufacture, transport or storage or wrinkles due to overlapping or moisture absorption.

Transparent Sheets

Transparent sheets must not melt or curl excessively at the high temperatures (200°C for about a second) and pressures (500-800gf/cm2) of heat fixing. The film edge must be cut with the same accuracy as that of cut sheets.

Recommended paper: Fuji Xerox / 3M

Label Sheets

Label sheets are composed of a printing surface, an adhesive, and a carrier sheet. The adhesive must never come in contact with the photosensitive drum or feed roller. There must be no space between labels and labels must not peel off or get turned up on the carrier sheet. The label must be entirely covered the carrier sheet. The adhesive must not melt or swell at the high temperatures (200°C for about one second) and pressures (500-800gf/cm2) of heat fixing.

Note: The use of damp, curled or torn paper may cause a jam or paper curled or unclear print. Avoid using such paper.

5. Setting Up the Printer

5.1 Structure

This printer is made up of the items shown below. Make sure that you have everything shown here.

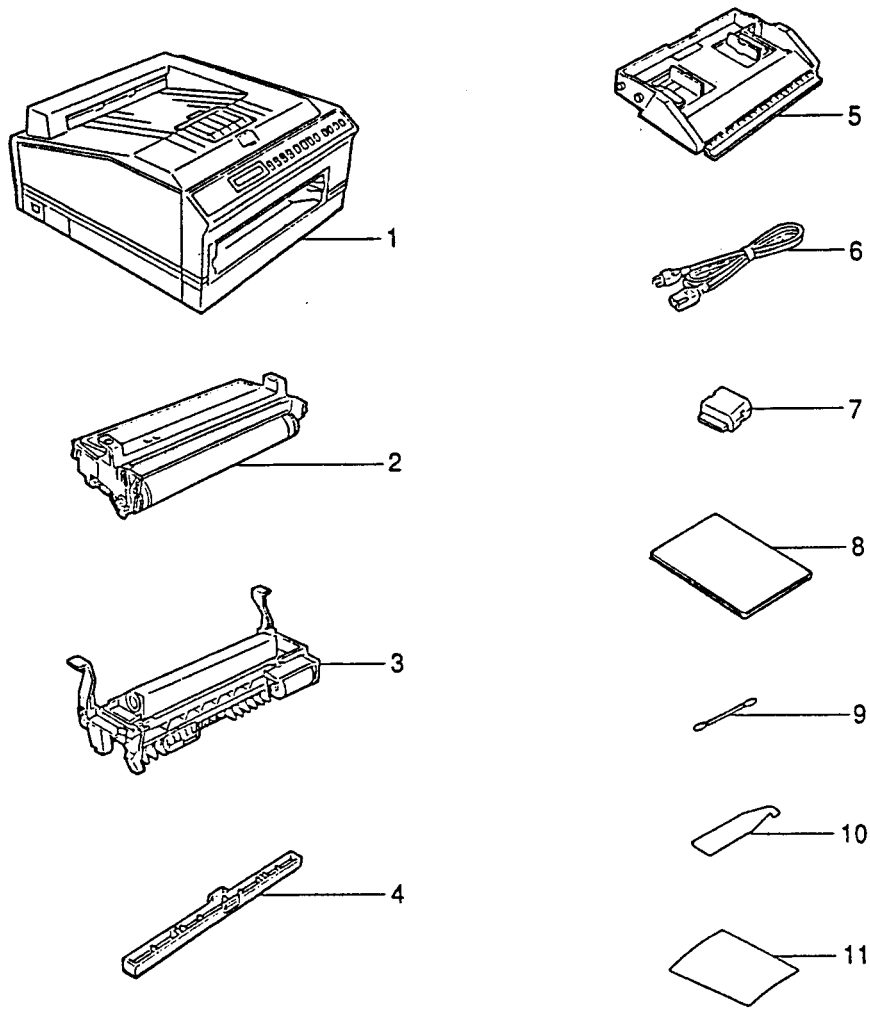


Fig. 2-8 Structure

1	Printer	6	Power cord
2	Drum unit	7	Drum counter
3	Developer unit and toner cartridge	8	Instruction manual
4	Cleaning pad	9	Cotton swab
5	Multi paper cassette	10	Mylar scraper
		11	Unpacking instruction

5.2 Unpacking

5.2.1 Removing the accessory tray, and printer

(1) Open the carton and remove the accessory tray.

(2) Take the accessories off the accessory tray.

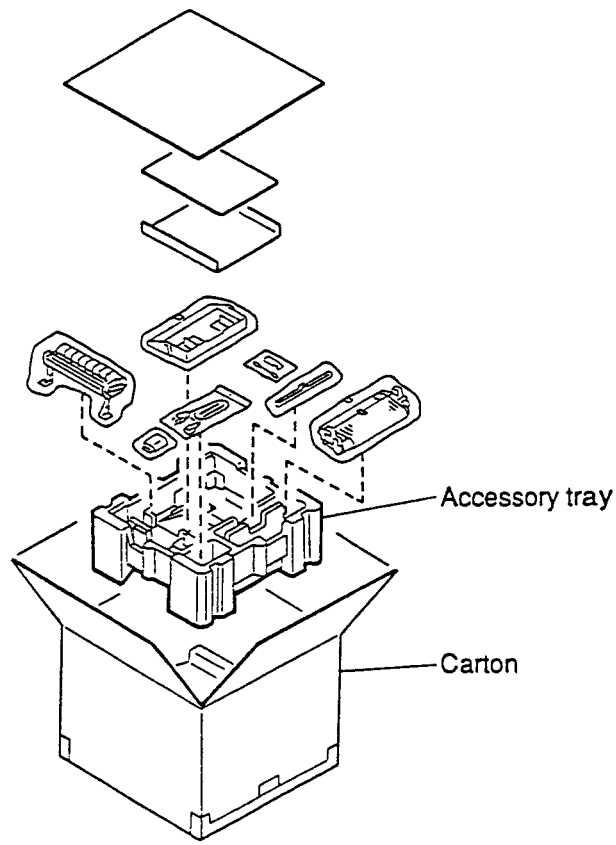


Fig. 2-9 Unpacking

(3) Lift out the printer.

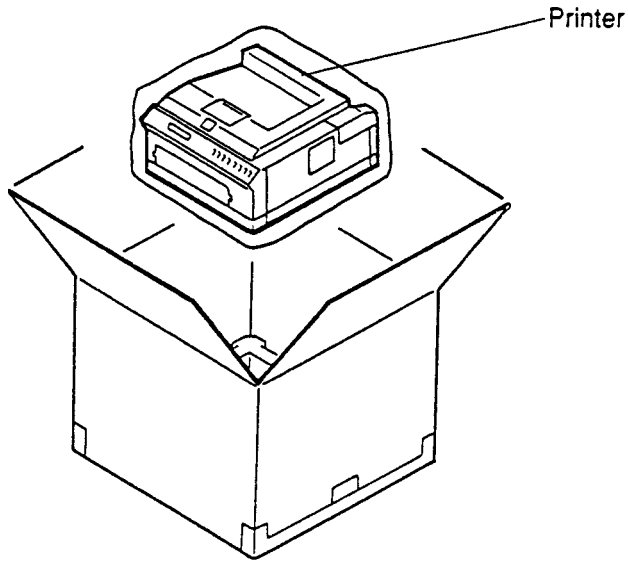


Fig. 2-10 Unpacking

5.2.2 Opening the top cover

(1) Push the release latch to open the top cover.

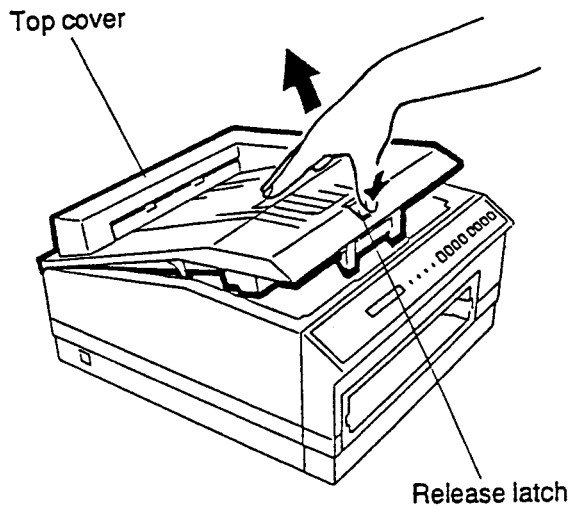


Fig. 2-11 Opening the top cover

(2) Push only around the central portion when closing the cover.

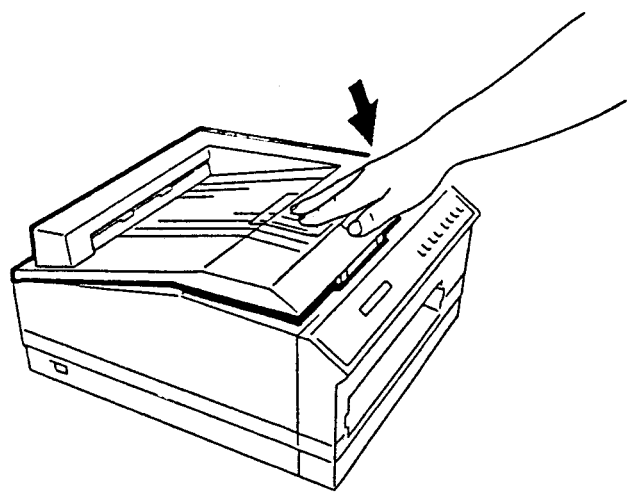


Fig. 2-12 Closing the top cover

5.2.3 Removing the packing materials

(1) Remove the packing materials from inside the printer.

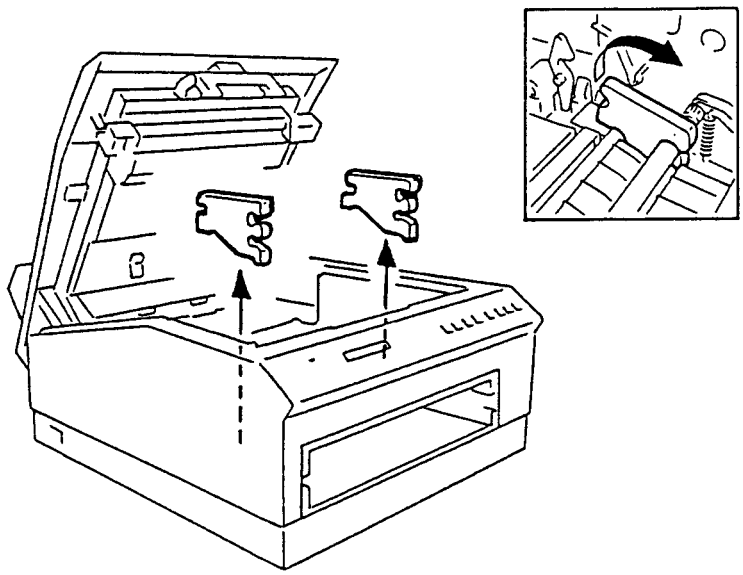


Fig. 2-13 Removing the packing materials

(2) Remove the tape from the multi paper cassette.

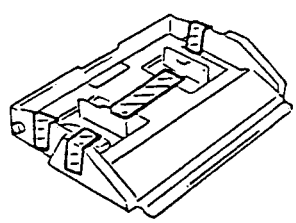


Fig. 2-14 Removing the tapes

5.3 Setting up

Note: Before setting up, be sure to turn the power OFF.

5.3.1 Installing the cleaning pad

(1) Push the release latch to open the top cover, and install the cleaning pad.

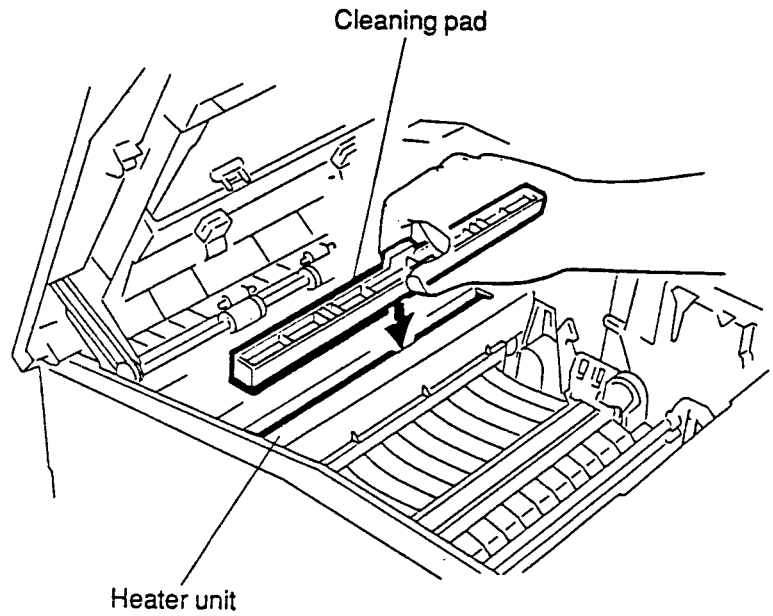


Fig. 2-15 Installing the cleaning pad

5.3.2 Installing the drum unit, developer unit, and toner cartridge

(1) Shake the developer unit horizontally four or five times.

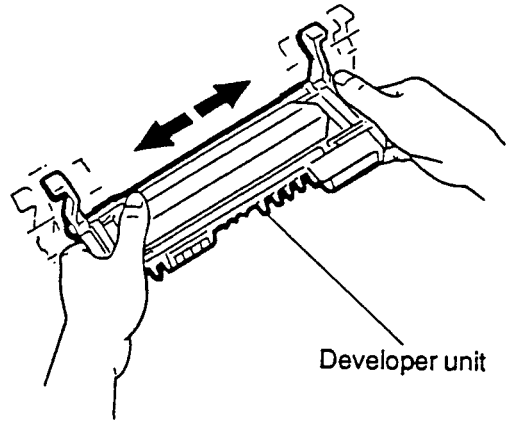


Fig. 2-16 Installing the developer unit

(2) While pressing the top of the toner cartridge, pull out the film horizontally.

Note: Toner is adhering to the film to be removed from the toner cartridge. Toner is not harmful to the human body. However, if any toner gets you, be sure to wash away the toner immediately. Since toner cannot be removed easily, be careful not to get your clothes, furniture, etc. dirty with toner.

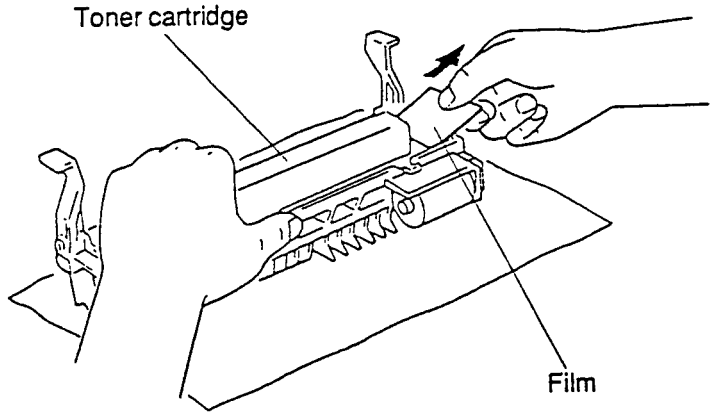


Fig. 2-17 Installing the developer unit

(3) Take out the new drum unit and clean the charger wire with a cotton swab.

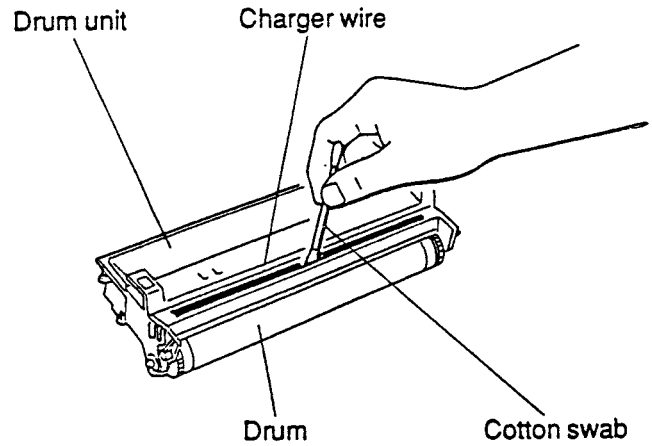


Fig. 2-18 Cleaning the charger wire

WARNING:
- Take care not to damage the charger wire.
- Do not touch the drum surface or magnet roller. Damage to or dirt on the drum surface or magnet roller will result in lower print quality. The drum surface cannot be cleaned.
- When placing the drum unit on a table etc. take care that youdo not damage the surface of the drum unit.

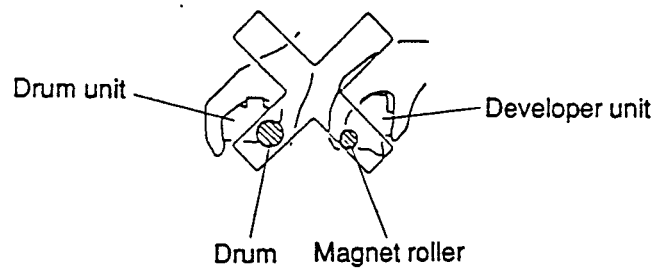


Fig. 2-19 Installing the developer block

WARNING:
- Do not leave the drum outside the machine for extended periods of time. Its photosensitive properties may be affected resulting in abnormally light or dark areas may occur or the drum's service life may decrease.

(4) Hook the drum unit to the developer unit.

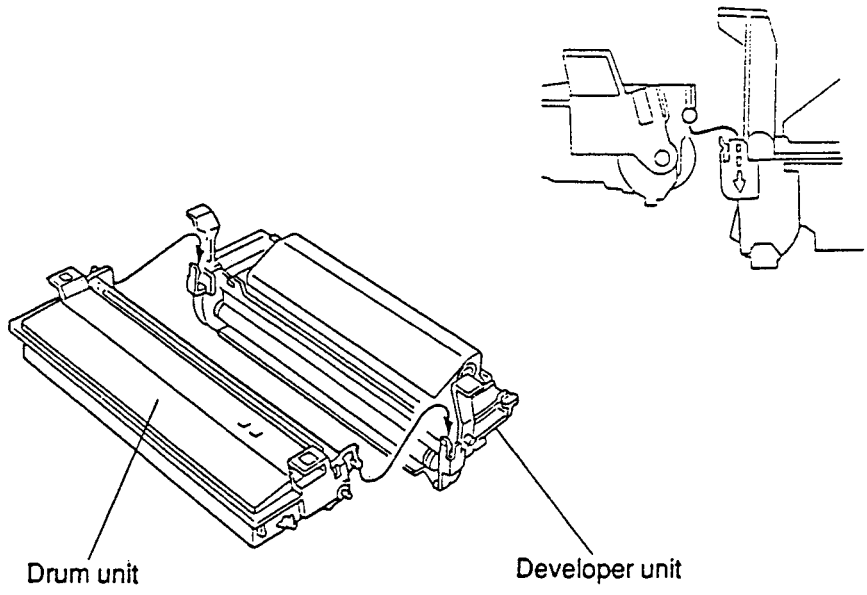


Fig. 2-20 Installing the drum unit

(5) Install the drum counter.
Insert the drum counter as shown below. Make sure to press it down the way until the red line pointed by the arrow can be seen.

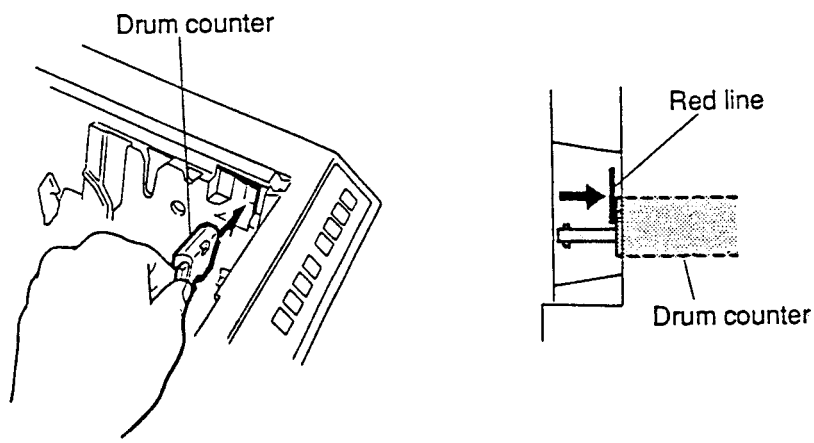


Fig. 2-21 Installing the drum counter

Notes: • The drum counter and drum unit must always be replaced together.
• The printer can not operate unless the drum counter is installed.

(6) Align the positioning shafts on either side of the developer unit with the base frame, then install the developer block.

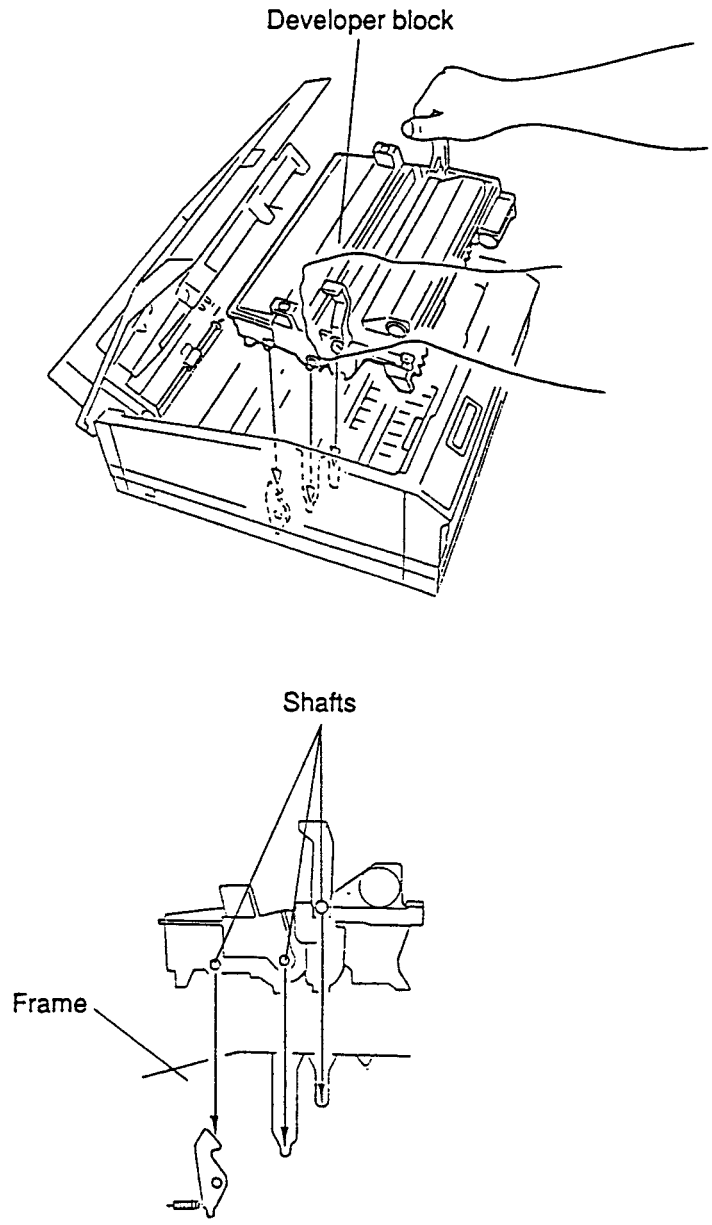


Fig. 2-22 Installing the developer block

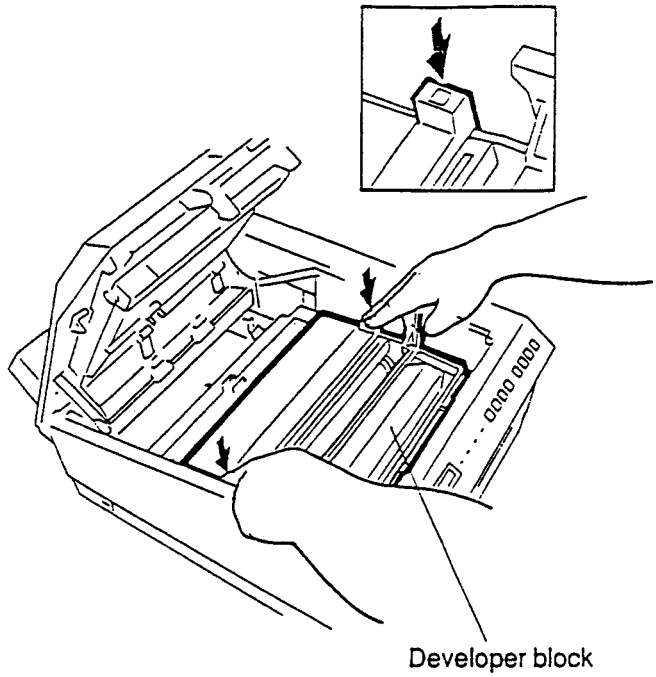


Fig. 2-23 Installing the developer block

Note: When installing the developer block, press down simultaneously on the developer block's two green handles until the developer block clicks into its place.

(7) Close the top cover.

5.3.3 Installing the paper cassette

Align the tabs on either side of the cassette with the slots in the base, then mount the paper cassette by inserting it.

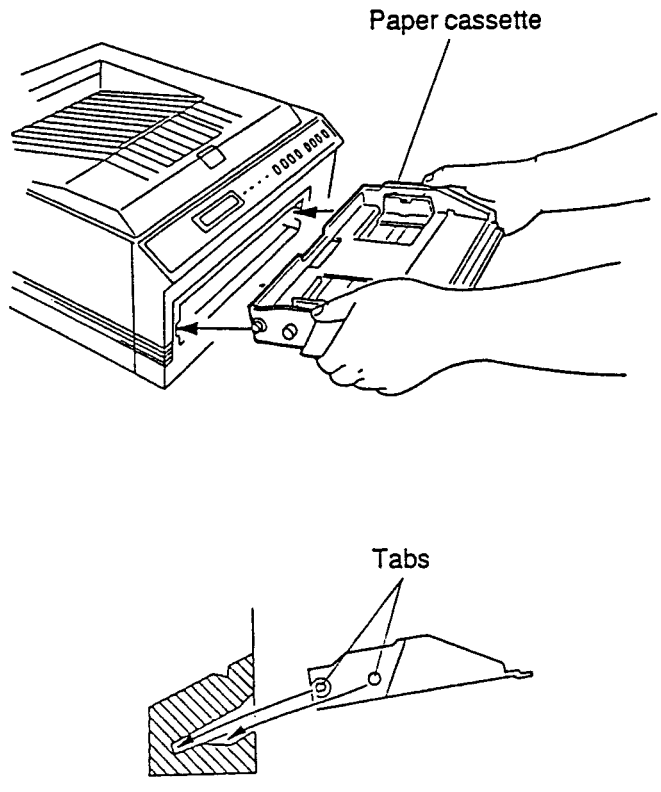


Fig. 2-24 Installing the paper cassette

Note: If the paper cassette is not installed securely, a paper empty error, insertion error or paper jam error may occur.

5.3.4 Attaching the power cord

(1) Check that the power switch on the left of the printer is in the OFF (O) position.

(2) Plug the power cord into the power inlet on the back of the printer.

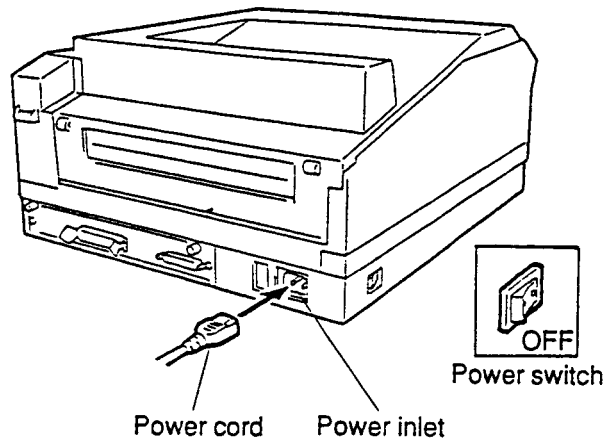


Fig. 2-25 Attaching the power cord

6. Preparations for Printing

6.1 Power ON

"Warming up" starts as soon as the printer is turned ON. During warming up, which takes about 60 seconds (23°C, 512 Kbytes), the heater temperature is raised to the specified value for heat fixing.

6.1.1 Power ON procedure

(1) Attach the power cord to the power inlet at the back of the printer and plug the other end into an AC power outlet.
(Refer to 5.3.4, Attaching the power cord.)

(2) Push the power switch on the rear left-hand side of the printer to ON (|).

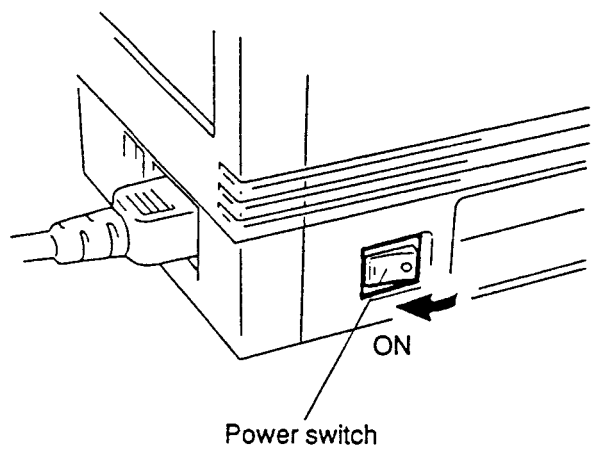


Fig. 2-26 Turning the power ON

6.1.2 Panel display

When the power is first turned ON, the message "INITIALIZE" will be displayed as the printer initializes.

The display will then change to "WAIT" while the printer warms up.

About 60 seconds after the "WAIT" message appears, "ON-LINE" will be displayed indicating that printing is possible.

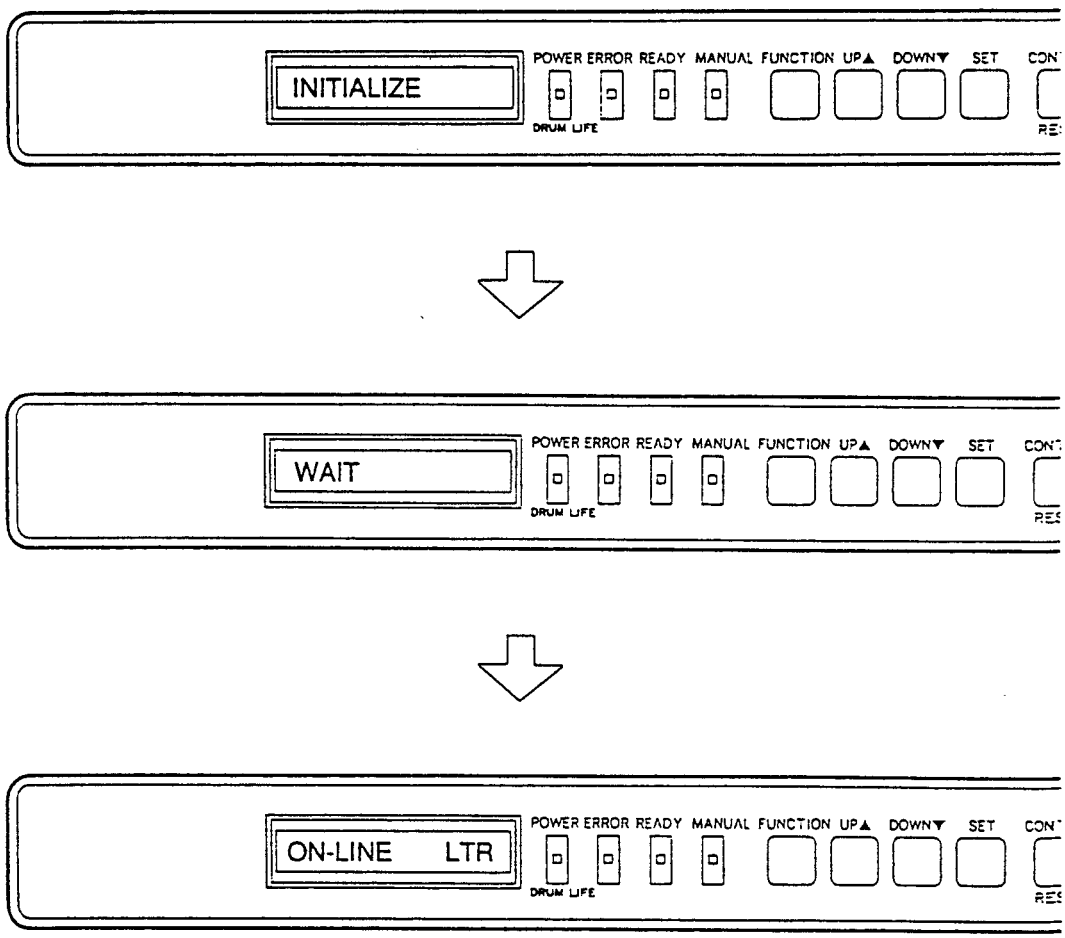


Fig. 2-27 Panel display

Note: The above display appears when paper has been inserted. If no paper is inserted, the message "MC EMPTY" will be displayed.

6.2 Test prints

This printer has three test print functions. Perform a "test print" whenever you need to check the status of the printer's various settings.

6.2.1 Test print A (self test)

This test print function prints out the characters in the resident font using a sliding pattern.

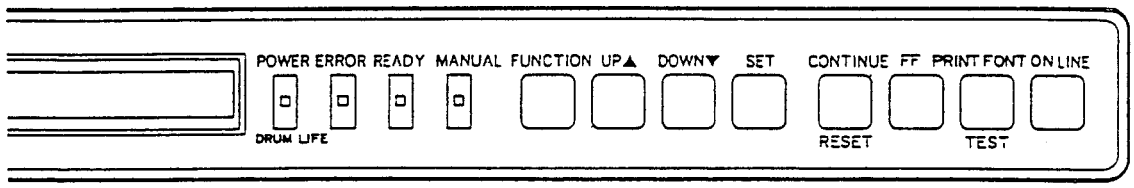


Fig. 2-28 Test print A

<Procedure>

1) Place paper in the paper cassette.

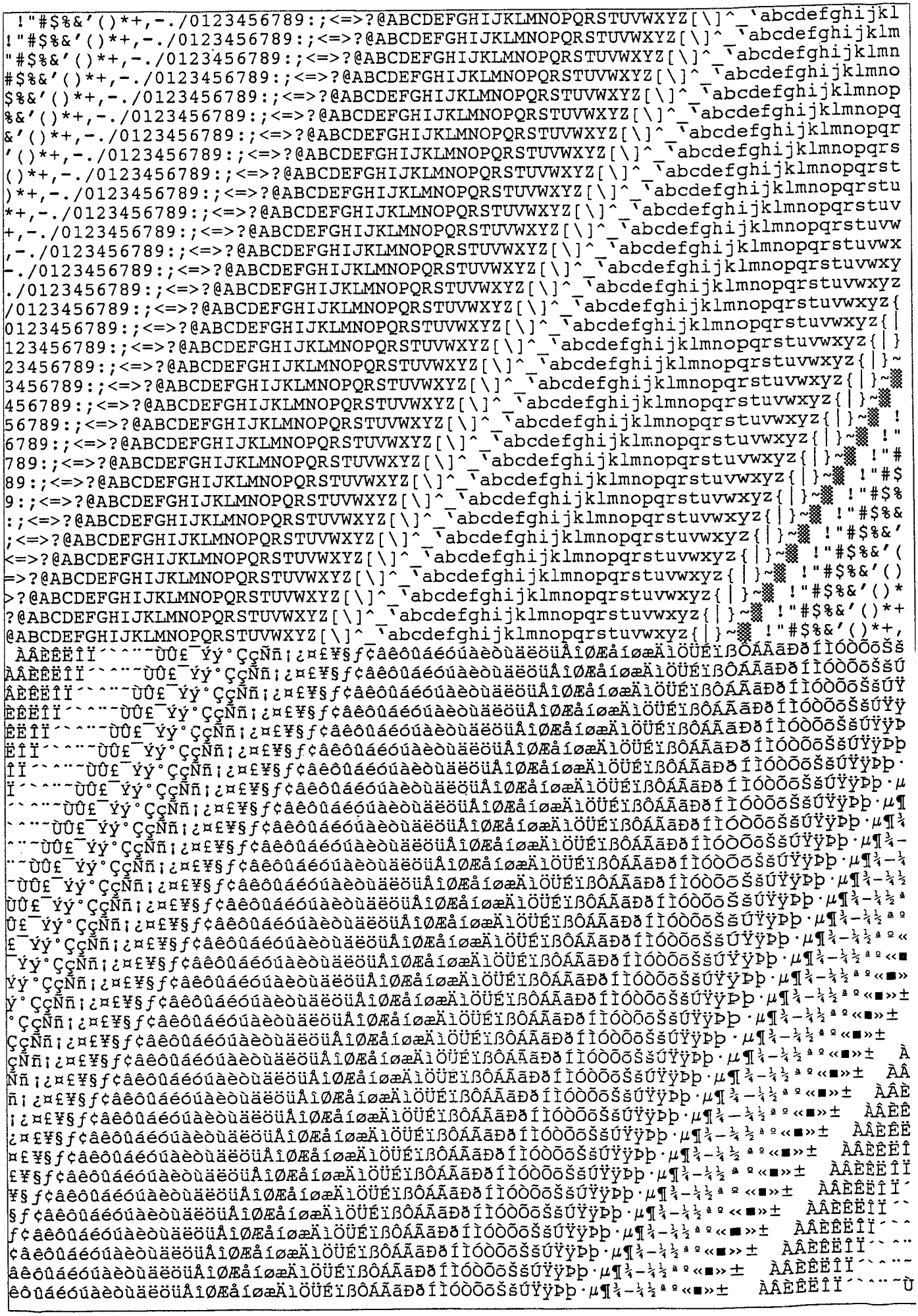
2) Turn the power ON.

3) After checking that the printer is ON-LINE, press the [ON LINE] key to switch the printer into the OFF-LINE status.

4) Press the [UP Δ] and [DOWN ∇] keys simultaneously.

5) The LCD will display the message "SELF TEST" and the test print will begin.

6) When printing is finished, press the [ON LINE] key to return the printer to ON-LINE status.



6.2.2 Test print B (font print)

This test print function prints a list of selectable fonts.

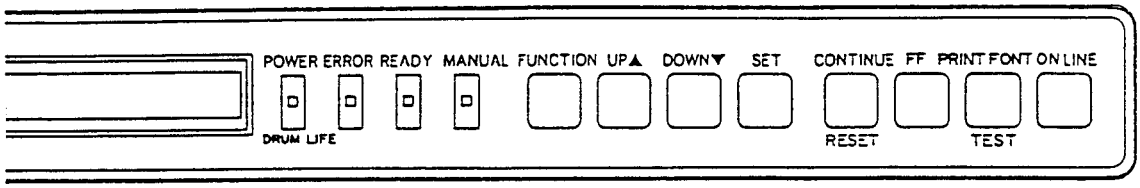


Fig. 2-29 Test print B

<Procedure>

1) Place paper in the paper cassette.

2) Turn the power ON.

3) After checking that the printer is ON-LINE, press the [ON LINE] key to switch the printer into the OFF-LINE status.

4) Press the [PRINT FONT/TEST] key.

5) The LCD will display the message "FONT PRINT" and the test print will begin.

6) When printing is finished, press the [ON LINE] key to return the printer to the ON-LINE status.

- - - - - FONT LIST - - - - -

Font #	Font ID	Symbol Set	Fix /PS	Pitch (CPI)	Point Size	Style	Stroke Weight	Name or Typeface	Default Orient	Print Sample & Escape Sequence
INTERNAL FONTS										
I000		ROMAN-8	F	10.00	12.0	Upright	Medium	Courier	Port	ABCDEfghijÀÂ°ÇÑ¡¿£§ê#$@[]^`{|}~1 <Esc>(8U<Esc>(s0p10.00h12.0v0s0b3T<Esc>&l0O
I001		ROMAN-8	F	16.66	8.5	Upright	Medium	Line Printer	Port	ABCDEfghijÀÂ°ÇÑ¡¿£§ê#$@[]^`{|}~123éàèëöÅØåæÄ <Esc>(8U<Esc>(s0p16.66h8.5v0s0b0T<Esc>&l0O
I002		ROMAN-8	F	12.00	10.0	Upright	Medium	Courier	Port	ABCDEfghijÀÂ°ÇÑ¡¿£§ê#$@[]^`{|}~1 <Esc>(8U<Esc>(s0p12.00h10.0v0s0b3T<Esc>&l0O
I003		ROMAN-8	F	12.00	10.0	Upright	Bold	Courier	Port	**ABCDEfghijÀÂ°ÇÑ¡¿£§ê#$@[]^`{|}~1** <Esc>(8U<Esc>(s0p12.00h10.0v0s3b3T<Esc>&l0O
I004		ROMAN-8	F	12.00	10.0	Italic	Medium	Courier	Port	*ABCDEfghijÀÂ°ÇÑ¡¿£§ê#$@[]^`{|}~1* <Esc>(8U<Esc>(s0p12.00h10.0v1s0b3T<Esc>&l0O
I005		ROMAN-8	F	10.00	12.0	Upright	Bold	Courier	Port	**ABCDEfghijÀÂ°ÇÑ¡¿£§ê#$@[]^`** <Esc>(8U<Esc>(s0p10.00h12.0v0s3b3T<Esc>&l0O
I006		ROMAN-8	F	10.00	12.0	Italic	Medium	Courier	Port	*ABCDEfghijÀÂ°ÇÑ¡¿£§ê#$@[]^`* <Esc>(8U<Esc>(s0p10.00h12.0v1s0b3T<Esc>&l0O
I007		ECMA-94	F	16.66	8.5	Upright	Medium	Line Printer	Port	ABCDEfghij¡¢³´¶¸¹»½Á#$@[]^`{|}~123ÀÈÉÍÐÒÔ×Ø <Esc>(0N<Esc>(s0p16.66h8.5v0s0b0T<Esc>&l0O
I008		ECMA-94	F	12.00	10.0	Upright	Medium	Courier	Port	ABCDEfghij¡¢³´¶¸¹»½Á#$@[]^`{|}~1 <Esc>(0N<Esc>(s0p12.00h10.0v0s0b3T<Esc>&l0O
I009		ECMA-94	F	12.00	10.0	Upright	Bold	Courier	Port	**ABCDEfghij¡¢³´¶¸¹»½Á#$@[]^`{|}~1** <Esc>(0N<Esc>(s0p12.00h10.0v0s3b3T<Esc>&l0O
I010		ECMA-94	F	12.00	10.0	Italic	Medium	Courier	Port	*ABCDEfghij¡¢³´¶¸¹»½Á#$@[]^`{|}~1* <Esc>(0N<Esc>(s0p12.00h10.0v1s0b3T<Esc>&l0O
I011		ECMA-94	F	10.00	12.0	Upright	Medium	Courier	Port	ABCDEfghij¡¢³´¶¸¹»½Á#$@[]^` <Esc>(0N<Esc>(s0p10.00h12.0v0s0b3T<Esc>&l0O
I012		ECMA-94	F	10.00	12.0	Upright	Bold	Courier	Port	**ABCDEfghij¡¢³´¶¸¹»½Á#$@[]^`** <Esc>(0N<Esc>(s0p10.00h12.0v0s3b3T<Esc>&l0O
I013		ECMA-94	F	10.00	12.0	Italic	Medium	Courier	Port	*ABCDEfghij¡¢³´¶¸¹»½Á#$@[]^`* <Esc>(0N<Esc>(s0p10.00h12.0v1s0b3T<Esc>&l0O
I014		PC-8	F	16.66	8.5	Upright	Medium	Line Printer	Port	ABCDEfghijió|┤╣╕╗╜┴#$@[]^`{|}~123╪╚═╩╦└╪ <Esc>(10U<Esc>(s0p16.66h8.5v0s0b0T<Esc>&l0O
I015		PC-8	F	12.00	10.0	Upright	Medium	Courier	Port	ABCDEfghijió|┤╣╕╗╜┴#$@[]^`{|}~1 <Esc>(10U<Esc>(s0p12.00h10.0v0s0b3T<Esc>&l0O
I016		PC-8	F	12.00	10.0	Upright	Bold	Courier	Port	**ABCDEfghijió|┤╣╕╗╜┴#$@[]^`{|}~1** <Esc>(10U<Esc>(s0p12.00h10.0v0s3b3T<Esc>&l0O
I017		PC-8	F	12.00	10.0	Italic	Medium	Courier	Port	*ABCDEfghijió|┤╣╕╗╜┴#$@[]^`{|}~1* <Esc>(10U<Esc>(s0p12.00h10.0v1s0b3T<Esc>&l0O
I018		PC-8	F	10.00	12.0	Upright	Medium	Courier	Port	ABCDEfghijío|┤╣╕╗╜┴#$@[]^` <Esc>(10U<Esc>(s0p10.00h12.0v0s0b3T<Esc>&l0O
I019		PC-8	F	10.00	12.0	Upright	Bold	Courier	Port	**ABCDEfghijío|┤╣╕╗╜┴#$@[]^`** <Esc>(10U<Esc>(s0p10.00h12.0v0s3b3T<Esc>&l0O
I020		PC-8	F	10.00	12.0	Italic	Medium	Courier	Port	*ABCDEfghijío|┤╣╕╗╜┴#$@[]^`* <Esc>(10U<Esc>(s0p10.00h12.0v1s0b3T<Esc>&l0O
I021		PC-8 DN	F	16.66	8.5	Upright	Medium	Line Printer	Port	ABCDEfghijió|┤╣╕╗╜┴#$@[]^`{|}~123╪╚═╩╦└╪ <Esc>(11U<Esc>(s0p16.66h8.5v0s0b0T<Esc>&l0O
I022		PC-8 DN	F	12.00	10.0	Upright	Medium	Courier	Port	ABCDEfghijió|┤╣╕╗╜┴#$@[]^`{|}~1 <Esc>(11U<Esc>(s0p12.00h10.0v0s0b3T<Esc>&l0O
I023		PC-8 DN	F	12.00	10.0	Upright	Bold	Courier	Port	**ABCDEfghijió|┤╣╕╗╜┴#$@[]^`{|}~1** <Esc>(11U<Esc>(s0p12.00h10.0v0s3b3T<Esc>&l0O

6.2.3 Test print C (status print)

This test print function prints out a report on the printer's status.

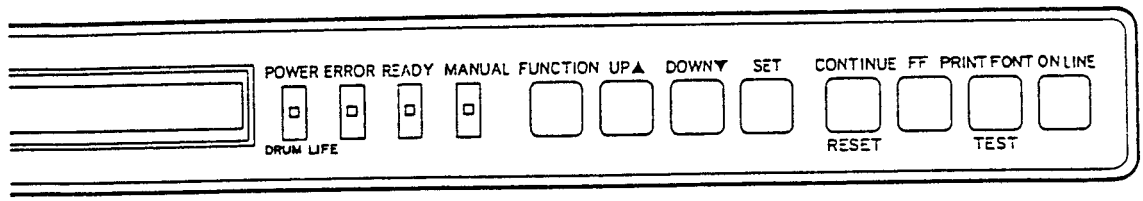


Fig. 2-30 Test print C

<Procedure>

1) Place paper in the paper cassette.

2) Turn the power ON.

3) After checking that the printer is ON-LINE, press the [ON LINE] key to switch the printer into the OFF-LINE status.

4) Press and hold the [PRINT FONT/TEST] key until the LCD display reads "STATUS PRINT."

5) The test print will begin.

6) When printing is finished, press the [ON LINE] key to return the printer to the ON-LINE status.

Version: V····

Memory :512K BYTES
Cartridge :

FUNCTION & MENU			
PAPER SET	A4	POWER ON	ONLINE
COPIES	1	DATA BUFFER	2K BYTES
MANUAL FEED	OFF	OVER LOAD	10%
THICK PAPER	OFF	TIME OUT PRINT	OFF
AUTO CONTINUE	ON	TIMER	30 SECOND
STATUS PRINT	OFF		

PAGE FORMAT			
PAGE LENGTH	70 LINES	LEFT MARGIN	0 COLUMNS
TOP MARGIN	3 LINES	RIGHT MARGIN	77 COLUMNS
TEXT LENGTH	64 LINES	PRINTABLE CHARACTER	77 CHARACTERS
VMI	6 LPI	HMI	10 CPI

INTERFACE			
INTERFACE	PARALLEL		

EMULATION (HPIIP Version: V····)			
FONT SOURCE	I	ORIENTATION	PORTRAIT
FONT NUMBER	0		
FORM	64		
SYMBOL SET	ROMAN8		

6.3 Adjusting the print density

Adjust the print density by selecting the print density adjust mode. The print density is adjustable in 5 steps from +2 to -2. The greater the value the darker the print-out will be. The density is set to 0 when the printer is delivered. The print density once set is retained until it is changed.

Note: Increasing print density increases the consumption of toner.

(1) Key operation in print density adjust mode

Key	Function
UP Δ	Increases print density.
DOWN ∇	Decreases print density.
SET	Sets density.
PRINT FONT/TEST	Performs a print test.
RESET	Returns from print density adjust mode to normal mode.
Function	Selects the paper size (letter or A4) to perform a print test.

(2) Print density adjusting procedure

Procedure	Key Operation	Display
1) Enter print density adjust mode.	ON LINE + Power ON (Turn the power ON while pressing the ON LINE key.)	XXXXXXXXXXXXXX DENSITY = 0 *: A4
2) Change the print density.	UP Δ	DENSITY = XX: A4
	DOWN ∇	
3) Set the print density.	SET	DENSITY = XX*: A4
4) Select the paper size to perform the print test with the new print density set.	FUNCTION	DENSITY= XX*: A4 DENSITY= XX*: LTR
5) Start the print test.	PRINT FONT/TEST	DENSITY= XX*: A4
6) Return from print density adjust mode to normal mode.	RESET	ON LINE LTR

Note: Paper is supplied from the multi paper cassette.

6.4 Connection to the host computer

This printer is equipped with an 8-bit Centronics parallel interface and a serial interface (RS-232C or RS-422A). Connect the host computer to the appropriate interface connector on the printer with the power OFF.

To switch between the 8-bit Centronics parallel interface and the serial interface, use the main directory to change the function setting. Refer to Section 8, "Function Setting."

6.4.1 Centronics 8-bit parallel interface

After connecting the interface cable, use the hooks to secure the connector.

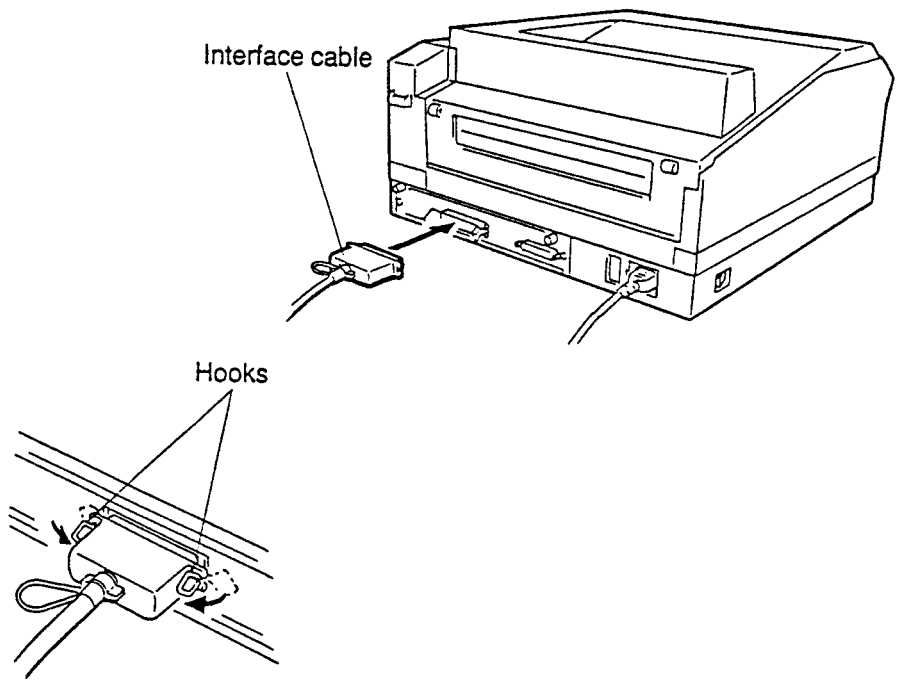


Fig. 2-31 Parallel interface

6.4.2 RS-232C / RS-422A serial interfaces

Notes:
- Before connecting the interface cable, refer to Section 6.5, "DIP switches", for instructions on how to select between the RS-232C and RS-422A interface.
- When using the RS-232C / RS-422A serial interface, be sure to properly change the interface setting. Refer to Section 8, "Function Setting."

After connecting the interface cable, tighten the screws to secure the connector.

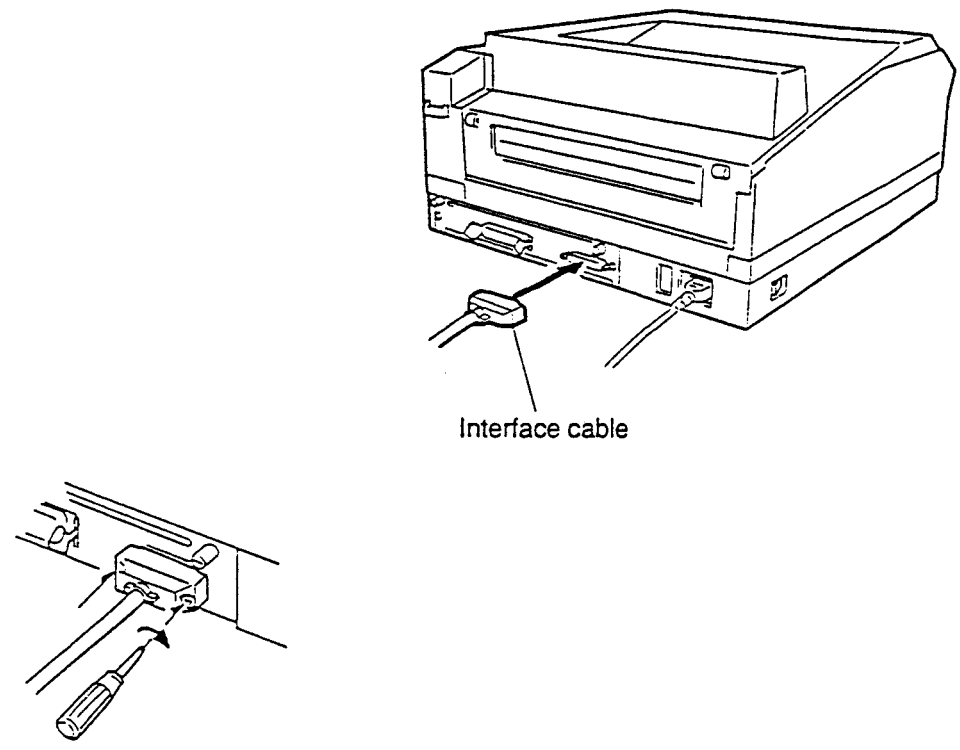


Fig. 2-32 Serial interface

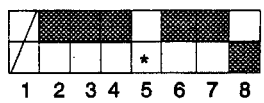
6.5 DIP switches

You may select between the following using the DIP switches located on the printed circuit board.

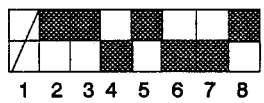
(1) RS-232C or RS-422A serial interface

(2) US or European default function setting

6.5.1 Selecting RS-232C or RS-422A

RS-232C: 

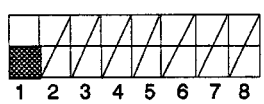
Pin No. 8 ON

RS-422A: 

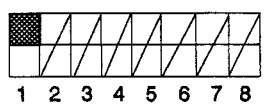
Pin No. 4, 6, 7 ON

*: If switch 5 is ON when using the RS-232C interface, pin 25 on the connector will be set at +5V. If switch 5 is OFF, pin 25 is "Not Used." Switch No. 1 is ignored for this setting. The function settings in the I/F directory will change.
Switches No.2 and 3 are dummy switches.

6.5.2 Selecting default function settings

US: 

Pin No. 1 ON

EU: 

Pin No. 1 OFF

Switches No. 2 through 8 are ignored for this setting. The paper size function and form function settings will change.

6.5.3 Setting procedure

(1) Turn the power OFF. Then, remove the power cord and the interface cable.

Note: If either an optional emulation cartridge is installed into the cartridge slot (located on the right rear side of the printer), remove the cartridge.

(2) Loosen the two screws on the rear panel of the printer. Then, pull out the PCB (printed cicuit board).

(3) See section 6.5.1, "Selecting RS-232C or RS422-A and 6.5.2, "Selecting default function settings", to change the setting of the DIP SW 1.

(4) Install the PCB.

(5) Replace the interface cable and the power cord.

6.6 Host computer

This printer has a resident HP emulation which makes it possible to use it with commercially-available application software designed for use with the HP LaserJet IIP.

- Printer drivers

  Most application software calls for designation of the printer type to be used through the selection of a printer driver. This driver is a program which is used when your software sends commands to the printer. Most application programs have a setup procedure which displays a list of drivers for selection.

  When using HP emulation, select one of the following printer drivers. (The list below is arranged in order of preference.)

  HP LaserJet IIP
  HP LaserJet Series II
  HP LaserJet Plus™
  HP LaserJet™

  Optionally available emulation cartridges allow you to use software designed for use with the following printers.

  Diablo 630
  EPSON FX-850
  IBM Proprinter XL
  IBM Proprinter XL24e
  HP 7475A Graphics Plotter
  PDL

6.7 Hexadecimal dump

This mode uses the hexadecimal format to print the received data from the host computer.

After the printer has been connected to the computer, this function lets you know what kind of data is being sent from the host computer.

< Procedure >

1) Place paper in the paper cassette.

2) Hold down the [FUNCTION] key and the [SET] key while you turn on the POWER SWITCH.

3) The LCD will display the message "HEX DUMP", and the printer will print the received data from the host computer with the hexadecimal code.

4) This mode remains valid until the power switch is turned OFF.

7. Operation

7.1 Operation panel

The operation panel is located on the front of the printer. It consists of eight keys, four LED indicators and a LCD display.

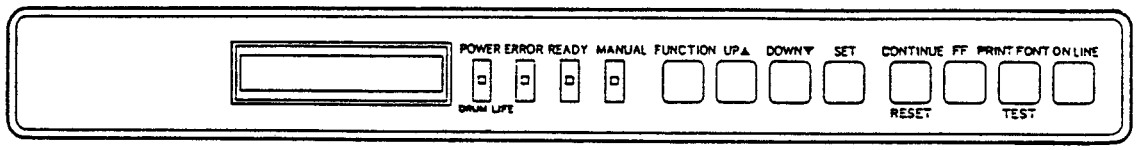


Fig. 2-33 Operation panel

7.1.1 Key Functions

(1) [ON LINE] Key

This key is used to switch the printer between ON-LINE and OFF-LINE status.

(2) [PRINT FONT/TEST] Key

This key is used when performing a font print or status print. It is enabled when the printer is OFF-LINE.

(3) [FF] Key (Form Feed)

Use this key when the "DATA EXIST" or "PUSH F.F. KEY" message is displayed. When the key is pressed in response to the "DATA EXIST" message, the printer will print the data stored in the printer.

(4) [CONTINUE/RESET] Key

This key is used to return the printer to its default status. This is done by holding this key down while the printer is OFF-LINE until the "INITIALIZE" message appears.
If AUTO CONT function is OFF, this key will clear error mode.

(5) [FUNCTION] Key

This key is used to switch the printer between normal mode and function setting mode. This key is only enabled when the printer is OFF-LINE.

(6) [UP Δ] Key

This key is used for selecting items in function setting mode. Pressing this key selects the next function or setting.

(7) [DOWN] Key

This key is used for selecting items in function setting mode. Pressing this key selects the previous function or setting.

(8) [SET] Key

This key is used to select between functions or settings in function setting mode.

7.1.2 LED Indicators

(1) **POWER / DRUM LIFE** LED

This LED indicates that power is turned ON. It also indicates the number of sheets printing using the current DRUM.

When green .....1 to 7,499 sheets of paper
When orange .....7,500 to 9,899 sheets of paper
When red .....More than 9,900 sheets of paper

(2) **ERROR** LED

This LED lights to indicate that a printer error has occurred.

(3) **READY** LED

This LED indicates the printer's status.

When lit .....printer is ON-LINE
When flashing .....printer is receiving data and processing data
When off .....printer is OFF-LINE

(4) **MANUAL** LED

This LED indicates that the printer is in manual feed mode. This mode is selected using a function setting.

7.1.3 LCD Display

The printer has an LCD display which can display up to 16 characters.

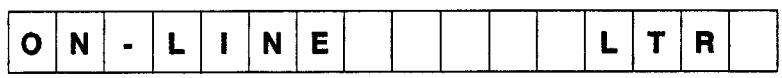
7.1.4 LCD Display Messages

Status messages and their meaning.

(1)

During warming up

Displayed during self-diagnostics or during warm up after power is turned ON and the top cover is closed.

(2) 

Printer ON-LINE

Displayed when the printer is ready to receive data.
(Paper size)

(3)

Printer OFF-LINE

Displayed when the printer cannot receive data.
(Paper size)

(4)

Printing font table

Indicates that the printer is printing out the selectable fonts for the selected emulation mode. The message changes to OFF-LINE when the print is complete.

(5) | I | N | I | T | I | A | L | I | Z | E | | | | | | | Printer initialize

Displayed when the printer is initialized.
At the initialization, the current function settings are stored in the NV RAM and the data in buffer is cleared

(6) | S | E | L | F | | T | E | S | T | | | | | | | Print test

Indicates that the printer is printing the ASCII character set (sliding pattern). The message changes to OFF-LINE when the print is complete.

(7) | S | T | A | T | U | S | | P | R | I | N | T | | | | Printing current status

Indicates that the current function setting are being printed. The message changes to OFF-LINE when the print is complete.

(8) | P | U | S | H | | F | . | F | . | | K | E | Y | | | Request to insert paper in manual feed mode

While in manual feed mode, indicates that the [FF] (form feed) key must be pressed to start printing. The [FF] key must be pressed for each page printed in manual feed mode.

(9) | D | A | T | A | | E | X | I | S | T | | | | | | Data exist in the buffer

Indicates data which is in the buffer. The data will be printed if the [FF] (form feed) key is pressed.

8. Function Setting

8.1 List of function settings

With this printer it is possible to change function settings to accommodate the various circumstances under which the printer may be used. The functions are divided among three directories: MAIN, I/F, and Emulation name. Depending on the emulation mode selected, the emulation name will be either HP2P, DI630, EPSON, IBM, HP-GL or PDL.

Note: When an optional cartridge (emulation or PDL) is installed, the directory for that cartridge will be displayed in addition to the three above.

8.1.1 Main directory functions

Function	Settings	Description
PAPER SET	LTR* LEG A4 (*) B5 EXE COM MON DL C5	Selects the paper size in cassette feed mode. When the size of the paper in the cassette does not match the paper size set using this function, the message "PAPER SIZE ERROR" will be displayed. The initial setting of this function varies with the shipping destination (U.S. or Europe).
COPIES	01* | 99	Selects the number of copies to be made. A maximum of 99 copies may be selected.
MANUAL FEED	OFF* ON	Selects between cassette and manual feed modes. When set to ON, the MANUAL LED will light, indicating that the printer is in manual feed mode.
THICK PAPER	OFF* ON	Selects between normal and thick paper modes. When set to ON, a number sign (#) will appear on the right side of the LCD, indicating that the printer is in thick paper mode.
AUTO CONT	ON* OFF	Selects the conditions for clearing errors.

* : Factory setting
(*) : Factory setting for European models

Note: Refer to 6.5, "DIP Switches ", for details on changing factory settings.
The PAPER SET, MANUAL FEED, and THICK PAPER functions become valid after being set, without pressing the [CONTINUE/RESET] key.

Function	Settings	Description
TRAY	2nd ONLY * 2nd MC BOTH	Designates from where paper is supplied. 2nd ONLY: Paper is supplied from the 2nd-bin feeder. Commands from the host computer are ignored. 2nd: Paper is supplied from the 2nd-bin feeder. MC: Paper is supplied from the paper cassette. BOTH : Paper is supplied from the 2nd-bin feeder. When the 2nd-bin feeder is empty, paper is supplied from the paper cassette. This function is enabled only when the optional 2nd-bin feeder is installed.
2nd SIZE	LTR* A4 (*)	Select a paper size for the 2nd-bin feeder. If the size of the paper in the 2nd-bin feeder is different from the function setting, the LCD will show "PAPER SIZE ERROR." This function is enabled only when the optional 2nd -in feeder is installed.
EMULATION	HPLJ* DI630 EPSON IBM HPGL PDL	Selects the emulation mode. Note that an optional cartridge is required for the use of emulation modes other than HPLJ, and so their names will not be displayed unless the proper cartridge is installed.
STATUS PRT	ON OFF*	Selects whether the printer's status will be printed out whenever power is turned ON. When set to ON, the status will be printed out.

* : Factory setting
(*) : Factory setting for European models

Note: Refer to 6.5, "DIP Switches", for details on changing factory settings.

Function	Settings	Description
POWER ON	ON LINE* OFF LINE	Selects the printer's status (ON-LINE or OFF-LINE) when power is turned ON.
DATA BUFFER	01 02* | 99	Selects memory data buffer size. Displayed in units of kilobytes. Note that when PDL emulation is used, the data buffer becomes fixed at 10 Kbytes. (LCD display is ignored.)
OVER LOAD	01 | 10* | 40	Selects the overload RAM buffer size. Displayed in percentile units: 10 = 10%. When DATA BUFFER is set to 02 and OVERLOAD is set to 10, the size of the overload RAM buffer will be 200 bytes.
TIME OUT	OFF* ON	Selects the action the printer will take when data is left in the printer. When OFF: The message "DATA EXIST" will be displayed. When ON: Time out printing will be done.
TIMER	01 | 30* | 90	Selects time out printing start time. This function becomes valid when TIME OUT is set to ON.
INDICAT	US* FR GE IT SP	The language in which messages on the LCD are given can be selected. Refer to the charts in Appendix C of this manual.

* : Factory setting
(*) : Factory setting for European models

Note: Refer to 6.5, "DIP Switches", for details on changing factory settings.

8.1.2 Interface directory functions

The interface directory allows the selection of the interface (parallel, RS-232C/RS-422A) to be used. When a serial interface (RS-232C or RS-422A) is selected, the following sub-function settings may be made.

Function	Settings	Description
BAUD RATE	19200 9600* 4800 2400 1200 600 300	Selects the data transfer rate.
PROT	RDY/ BSY(H)* RDY/ BSY(L) XON / XOFF	Selects the protocol.
DATA BIT	8* 7	Selects the number of data bits.
PARITY	NONE* ODD EVEN IGNORE	Selects the parity bit.
STOP BIT	1* 2	Selects the number of stop bits.
ROBUST-XON	ON* OFF	Selects Robust-XON ON: Additional XON's will be transmitted at 1 second intervals until data is received. OFF: Additional XON's are not transmitted.

*: Factory setting

Note: Refer to 6.5, "DIP Switches", for details on switching between RS-232C and RS-422A.

8.1.3 Emulation name** directory functions

Function	Settings	Description
FONT SOURCE	I* C S	Selects the default font. I: Internal font C: Cartridge font S: Download font
FONT NUMBER	000* | n	Selects the default font. The range of font numbers in the menu is determined by the font source selected.
ORIENTATE	PORT* LAND	Selects the direction of a page. PORT: PORTRAIT LAND: LANDSCAPE
FORM	005 | 060* | 064(*) | 128	Selects how many lines can be printed within the text length of the paper. The line pitch (LPI) is determined by selecting the number of lines to be printed per inch. The initial factory setting varies depending on the destination (U.S. or Europe).

* : Factory setting
(*) : Factory setting for European models
** : Depending on the emulation mode selected, the emulation name will be either HPLJ, DI630, EPSON, IBM, HP-GL or PDL.

Note: Refer to 6.5, "DIP Switches" for details on the changing of factory settings.

Function	Settings	Description
SYMBOL	ROMAN 8* ECMA-94 PC-8 PC-8DN PC-850 ISO2 ISO4 ISO6 ISO10 ISO11 ISO14 ISO15 ISO16 ISO17 ISO21 ISO25 ISO57 ISO60 ISO61 ISO69 ISO84 ISO85 GERMAN SPANISH	Selects the symbol sets. 24 symbol sets can be selected from the menu.

* : Factory setting
(*) : Factory setting for European models

Note: Refer to 6.5, "DIP Switches" for details on changing factory settings.

8.2 Changing function settings

This section describes how to change function settings. Function settings are stored in the printer memory and remain unchanged until they are reprogrammed. (Memory contents are retained even when the power is turned OFF.)

8.2.1 Using the operation panel

Functions can be programmed using the keys on the operation panel. The flow of setting is displayed on the LCD.

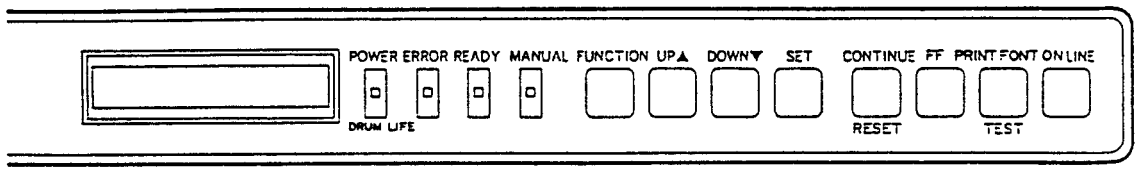


Fig. 2-34 Operation panel

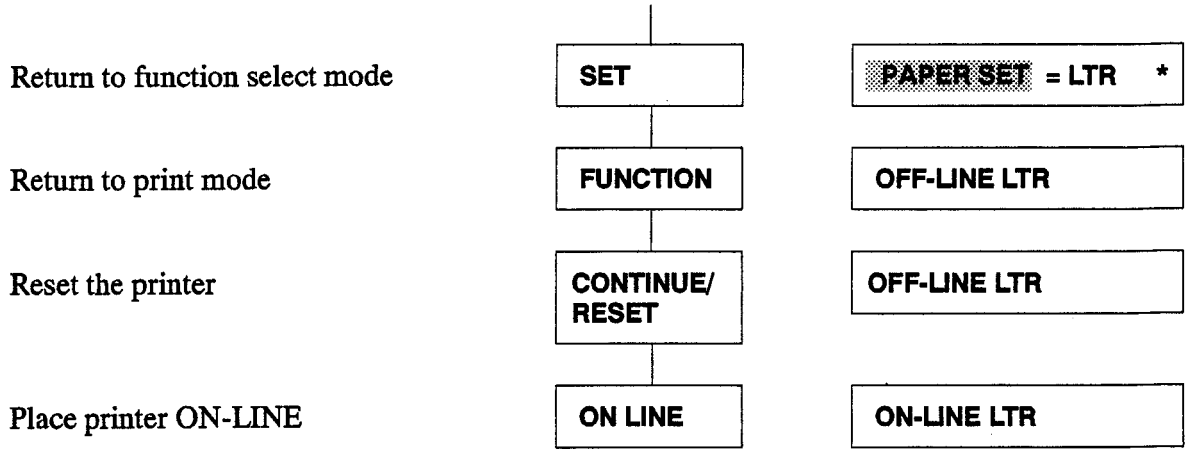
FUNCTION	This key is used to enter or leave function setting mode.
UP	This key is used to select the next function or setting (increment).
DOWN	This key is used to select the previous function or setting (decrement).
SET	This key is used to select functions or settings.
CONTINUE/RESET	This key is used to cancel function setting mode. The function settings changed will return to their original values.

8.2.2 Examples

In this section, the procedure for changing function settings will be explained using examples.

Example setting change 1 (Main directory)

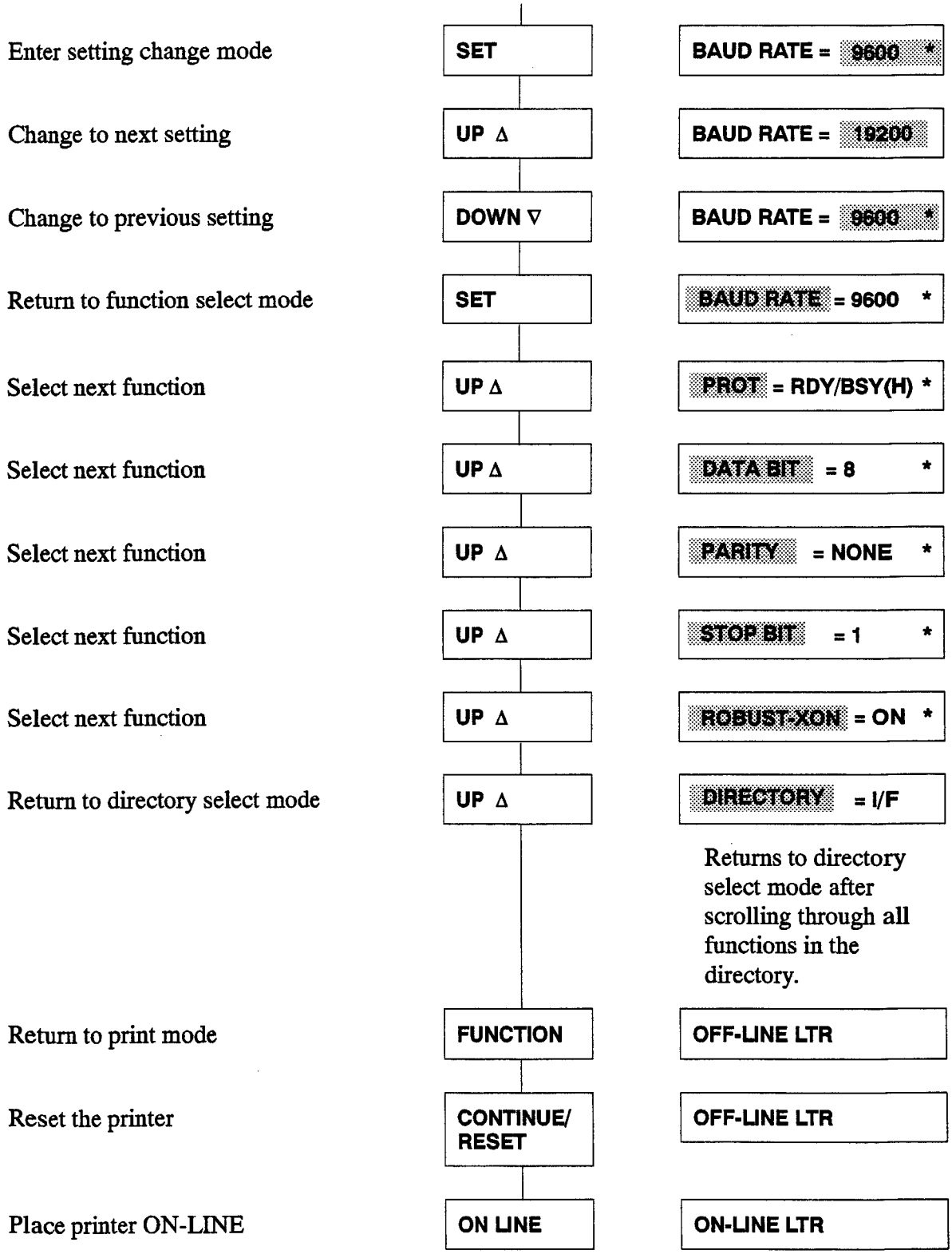
Explanation	Key operation	LCD display
Power ON	(Power ON)	WAIT
Take printer OFF-LINE	ON LINE	OFF-LINE LTR
Enter directory select mode	FUNCTION	DIRECTORY = MAIN
Enter function select mode	SET	PAPER SET = LTR *
Select next function	UP Δ	COPIES = 01 *
Select previous function	DOWN ∇	PAPER SET = LTR *
Enter setting change mode	SET	PAPER SET = LTR *
Change to next setting	UP Δ	PAPER SET = LEG *
Change to previous setting	DOWN ∇	PAPER SET = LTR



Note: The PAPER SET, MANUAL FEED, and THICK PAPER functions become valid after being set, without pressing the CONTINUE/RESET key.

Example setting change 2 (I / F directory)

Explanation	Key operation	LCD display
Power ON	(Power ON)	WAIT
Take printer OFF-LINE	ON LINE	OFF-LINE LTR
Enter directory select mode	FUNCTION	DIRECTORY = MAIN
Select next directory	UP Δ	DIRECTORY = I/F
Enter function select mode	SET	I/F = PARALLEL *
Enter setting change mode	SET	I/F = PARALLEL *
Change to next setting (RS-232C or RS-422A) * Display varies with printer setting	UP Δ	I/F = RS-232C
Enter function select mode	SET	I/F = RS-232C *
Select next function	UP Δ	BAUD RATE = 9600 *
Select next function	UP Δ	PROT = RDY/BSY(H) *
Select previous function	DOWN ∇	BAUD RATE = 9600 *


Enter setting change mode
SET
BAUD RATE = 9600 *
Change to next setting
UP Δ
BAUD RATE = 19200
Change to previous setting
DOWN ∇
BAUD RATE = 9600 *
Return to function select mode
SET
BAUD RATE = 9600 *
Select next function
UP Δ
PROT = RDY/BSY(H) *
Select next function
UP Δ
DATA BIT = 8 *
Select next function
UP Δ
PARITY = NONE *
Select next function
UP Δ
STOP BIT = 1 *
Select next function
UP Δ
ROBUST-XON = ON *
Return to directory select mode
UP Δ
DIRECTORY = I/F
Returns to directory select mode after scrolling through all functions in the directory.
Return to print mode
FUNCTION
OFF-LINE LTR
Reset the printer
CONTINUE/ RESET
OFF-LINE LTR
Place printer ON-LINE
ON LINE
ON-LINE LTR

Example setting change 3 (HP LaserJet directory)

Explanation	Key operation	LCD display
Power ON	(Power ON)	WAIT
Take printer OFF-LINE	ON LINE	OFF-LINE LTR
Enter directory select mode	FUNCTION	DIRECTORY = MAIN
Select next directory	UP Δ	DIRECTORY = I/F
Select next directory	UP Δ	DIRECTORY = HPLJ
Enter function select mode	SET	FONT SOURCE =1 *
Select next function	UP Δ	FONT NUMBER =000*
Select previous function	DOWN ∇	FONT SOURCE =1 *
Enter setting change mode	SET	FONT SOURCE= 1
Change to previous setting	DOWN ∇	FONT SOURCE= S
Change to next setting	UP Δ	FONT SOURCE= 1
Return to function select mode	SET	FONT SOURCE =1 *
Return to print mode	FUNCTION	OFF-LINE LTR
Reset the printer	CONTINUE/ RESET	OFF-LINE LTR
Place printer ON-LINE	ON-LINE LTR	ON LINE

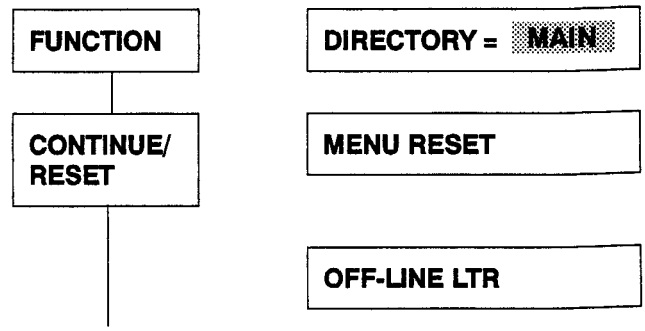
8.3 Restoring default settings

Carry out the following operations to restore the printer's functions to their default values (the settings that were in effect when the printer was shipped).

1. Enter directory select mode.

2. Press the CONTINUE/RESET key

   (Hold the CONTINUE/RESET key until the LCD indicates "MENU RESET")



Note: Refer to 8.1 List of Printer Function Settings, for details about default settings.

9. Paper Handling

9.1 Selecting paper size

The paper sizes available are as follows:

Automatic feed:	Letter, Legal, A4, B5, Executive, COM-10, Monarch, DL, C5
Manual feed:	82x148mm to 216x356mm (3.2"x5.8" to 8.5"x14")

For further specifications, refer to 4.3 Selecting Paper.

9.2 Paper feed methods

There are two modes of paper feed: Automatic and Manual. Automatic feed mode allows paper placed in the paper cassette to be automatically loaded into the printer. Manual feed mode allows you to put in one sheet at a time.

9.2.1 Automatic feed printing

For automatic feed printing, follow the procedures below.

(1) Open the paper tray guides and extend the paper support.

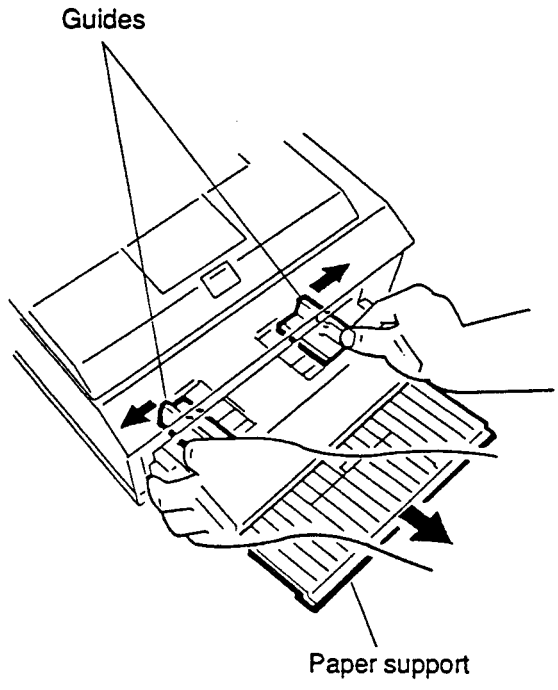


Fig. 2-35 Automatic feed printing

(2) Lift the cassette lever, then insert the paper.

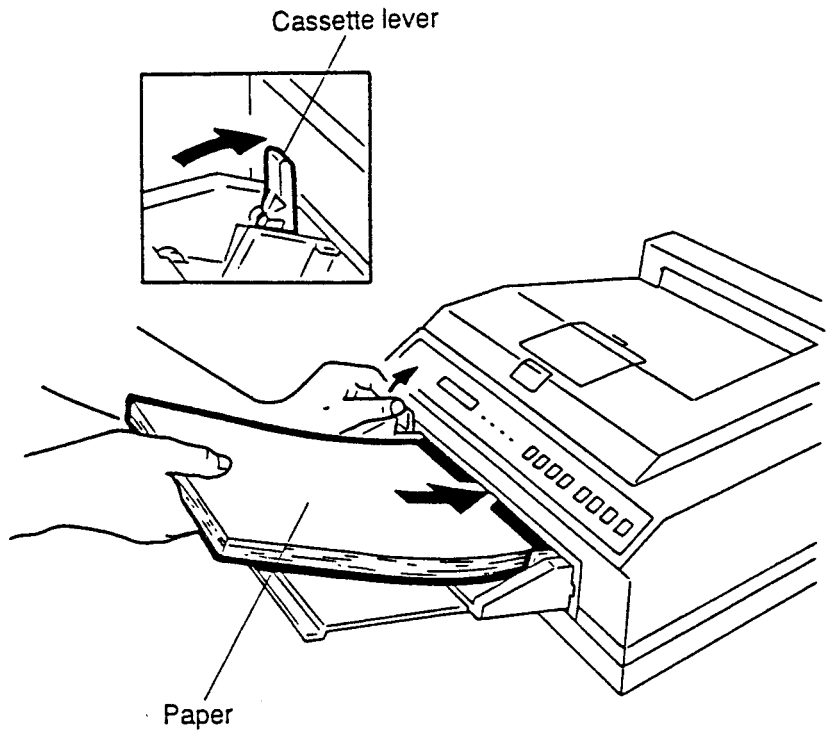


Fig. 2-36 Automatic feed printing

(3) Move the guides to fit closely against the paper. Lower the cassette lever to its original position.

Notes: • Do not place paper above the left guide line (about 100 sheets of 20lb paper).
• Do not insert paper when the cassette lever is down.
• Do not insert paper while the printer is in operation.

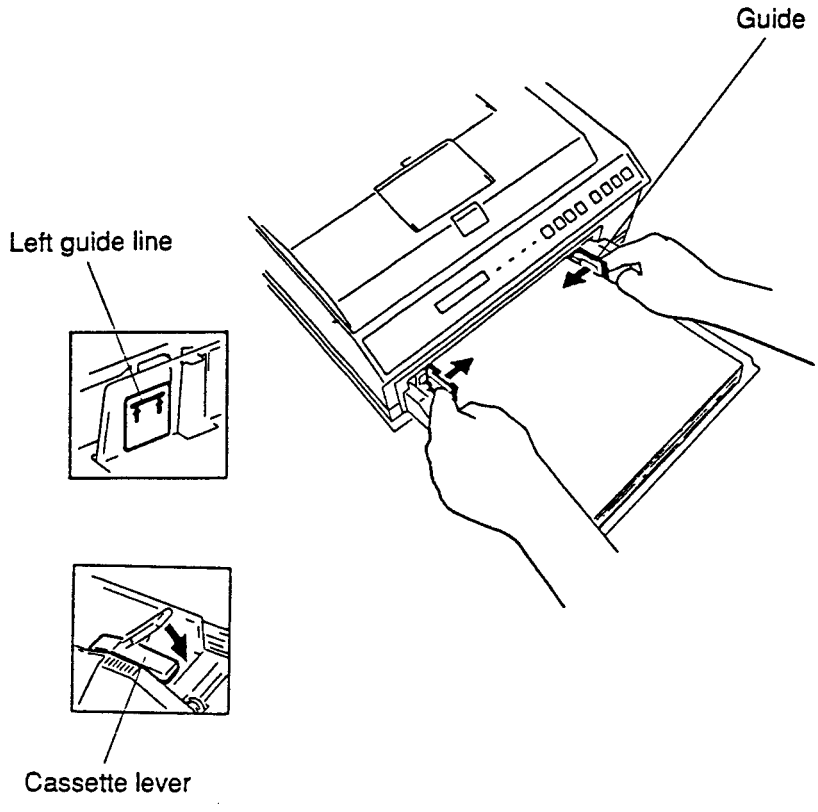


Fig. 2-37 Automatic feed printing

When printing on legal-size paper, use the support extensions.

Note: It is recommended that the paper support be used even when using any paper other than legal.

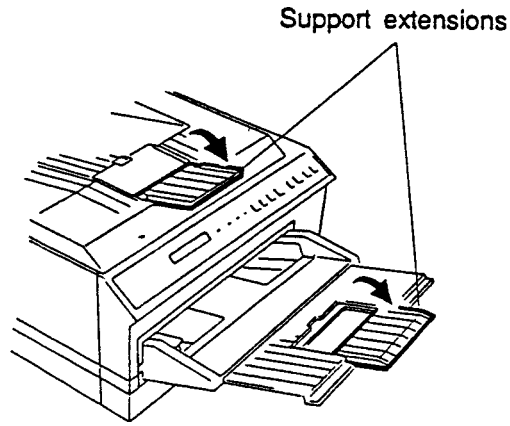


Fig. 2-38 Paper supports

Note: In automatic feed mode, the optional 2nd-bin feeder can be used.

9.2.2 Manual feed printing

For manual feed printing, follow the procedure below.

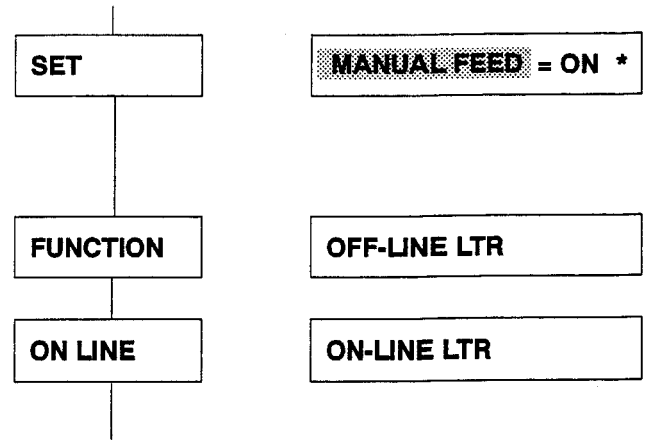
(1) To print in manual feed mode, begin by changing the "MANUAL FEED" function setting to "OFF".

	Explanation	Key operation	LCD display
1)	Turn the power ON.	POWER	WAIT
			ON-LINE LTR
2)	Take the printer OFF-LINE.	ON LINE	OFF-LINE LTR
3)	Enter directory select mode.	FUNCTION	DIRECTORY= MAIN
4)	Enter function select mode.	SET	PAPER SET = LTR *
5)	Select the next function.	UP Δ	COPIES = 01 *
6)	Select the "MANUAL FEED" function.	UP Δ	MANUAL FEED =OFF *
7)	Enter setting change mode.	SET	MANUAL FEED= OFF *
8)	Change the setting from "OFF" to "ON".	UP Δ	MANUAL FEED= ON

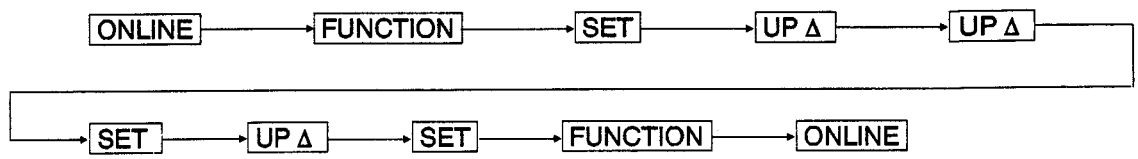
9) Return to function select mode. The MANUAL LED lamp on the operation panel should turn on.

10) Return to normal print mode.

11) Place the printer ON-LINE.



Note: To leave manual feed mode, change the "MANUAL FEED" function setting to "OFF" by referring to the procedure above. The MANUAL LED lamp should go out when the printer returns to automatic feed mode. The key operations to be performed on the operation panel are shown below.



(2) Lift the cassette lever, then remove all the paper from the paper cassette.

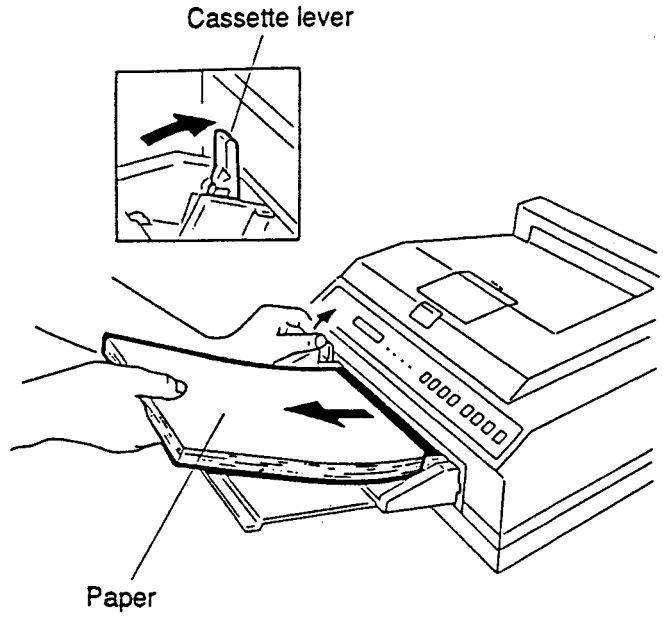


Fig. 2-39 Manual feed printing

(3) Lower the cassette lever. Insert a single sheet of paper until it touches the cassette feed roller. Adjust the left and right guides until they touch the sides of the paper. Then press the [ON LINE] key.

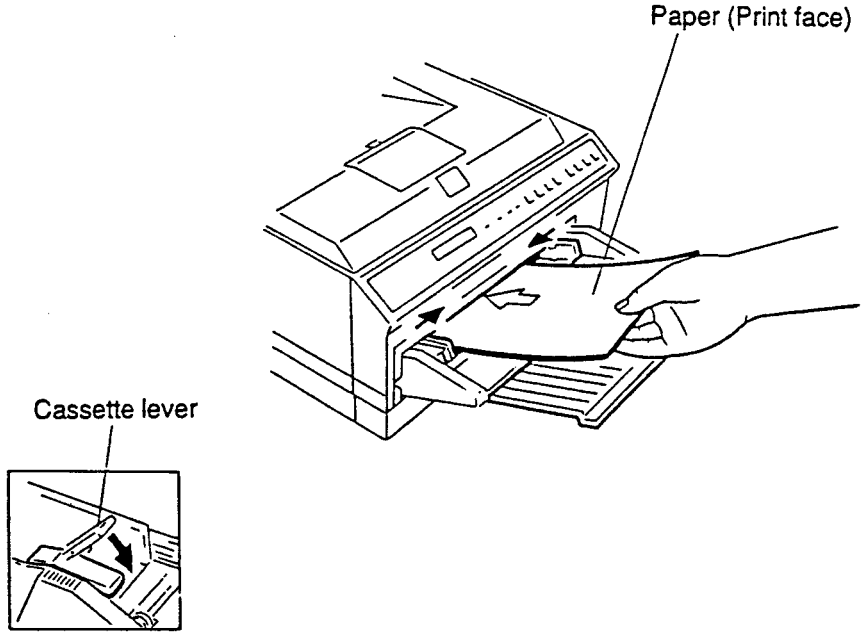


Fig. 2-40 Manual feed printing

(4) Data is sent from the host computer. At this time, the READY LED lamp on the operation panel should come on.

(5) When the computer finishes sending print data, the message "PUSH F.F. KEY" will be displayed. Press the [FF] key to start printing.

9.3 Selecting a paper eject mode

One of the two paper eject modes can be selected: face-down and face-up.

(1) Face-down eject mode

Paper is ejected face down when the paper eject selection lever (located on the back of the printer) is pushed toward the front of the printer. Pages are ejected onto the top cover.

Note: About 100 sheets of paper (80g/m^2, 20 lbs) can be stacked onto the top cover.

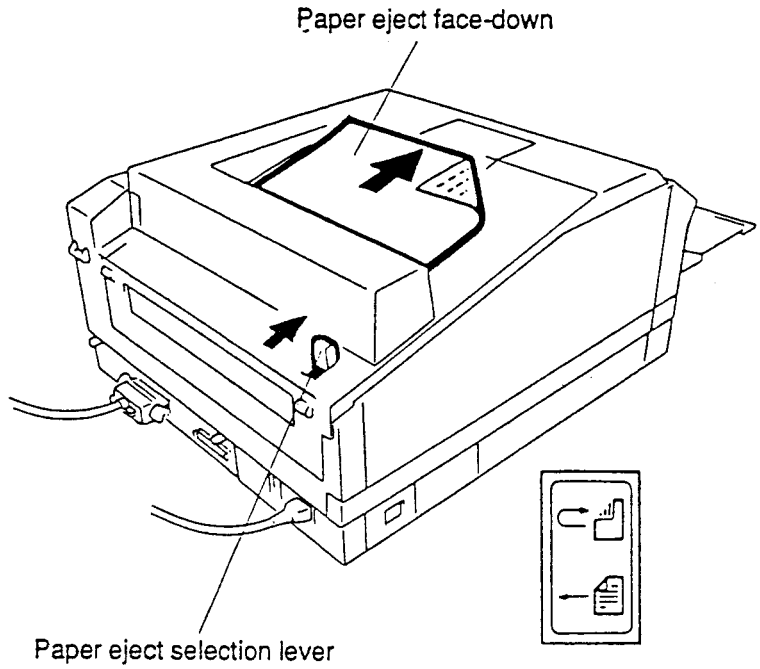


Fig. 2-41 Selecting a paper eject method (face down)

(2) Face-up eject mode

Paper is ejected face up when the paper eject lever (located on the back of the printer) is pushed toward the rear of the printer. Pages are ejected from the rear of the printer.

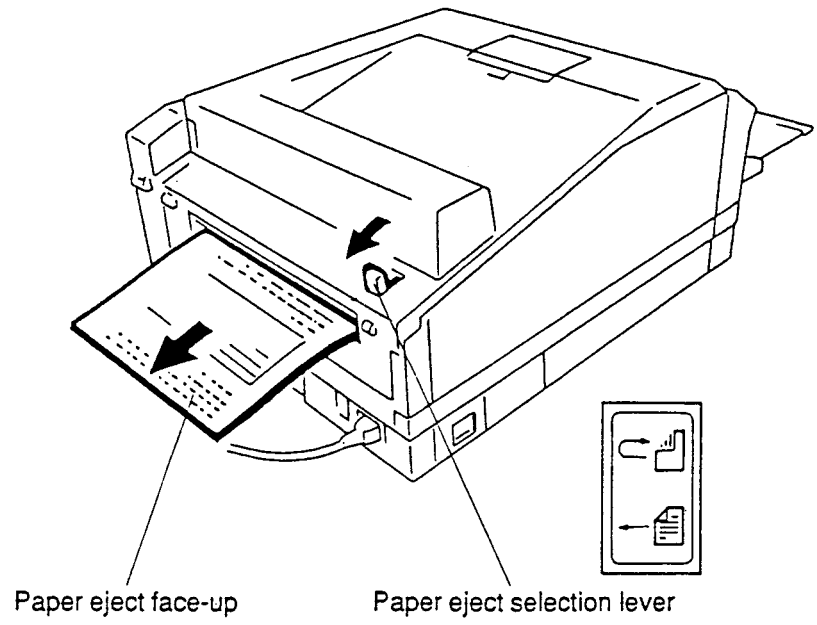


Fig. 2-42 Selecting a paper eject method (face up)

In face-up eject mode, paper is transported straight from the front to the rear in the printer. Face-up paper eject mode is suitable for printing on thick paper, envelopes, transparent sheets, and labels.

Note: The optional face-up tray can be used when ejecting pages face up.

9.4 Printing on thick paper

Thick paper can be printed on by following the procedure below.

(1) Change the "THICK PAPER" function setting to "ON".

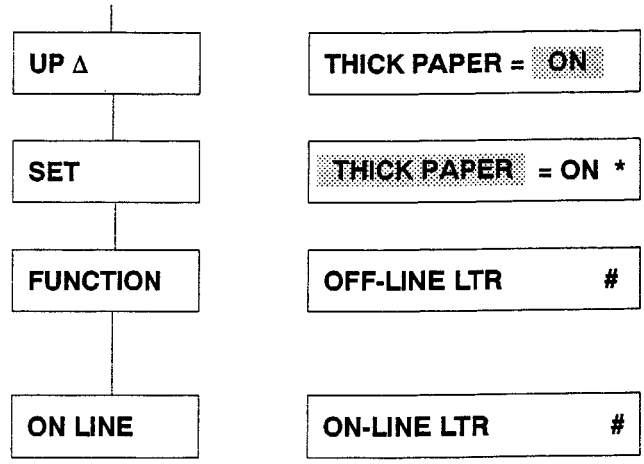
	Explanation	Key operation	LCD display
1)	Turn the power ON	POWER	WAIT
			ON-LINE LTR
2)	Take the printer OFF-LINE.	ON LINE	OFF-LINE LTR
3)	Enter directory select mode.	FUNCTION	DIRECTORY= MAIN
4)	Enter function select mode.	SET	PAPER SET = LTR *
5)	Select the next function.	UP Δ	COPIES = 01 *
6)	Select the next function.	UP Δ	MANUAL FEED =OFF *
7)	Select the "THICK PAPER" function.	UP Δ	THICK PAPER = OFF *
8)	Enter setting change mode.	SET	THICK PAPER= OFF *

9) Change the setting from "OFF" to "ON".

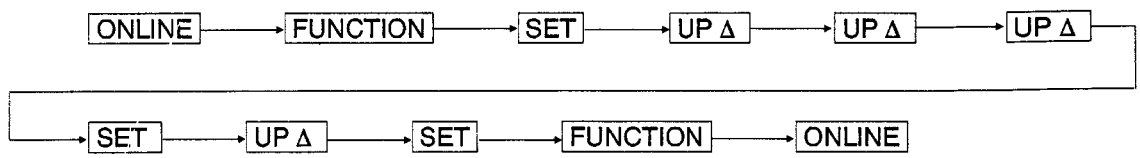
10) Return to function select mode.

11) Return to normal print mode. A number sign (#) should appear on the right side of the LCD.

12) Place the printer ON-LINE.



Note: To leave thick paper mode, change the "THICK PAPER" function setting back to "OFF" by referring to the procedure above. The "#" sign should disappear when the printer returns to normal paper mode. The key operations to be performed on the operation panel are shown below.



(2) Select the paper to be used. Feed the paper in manual feed mode by referring to Section 9.2.2, "Manual Feed Printing." The paper should be ejected in face-up eject mode.

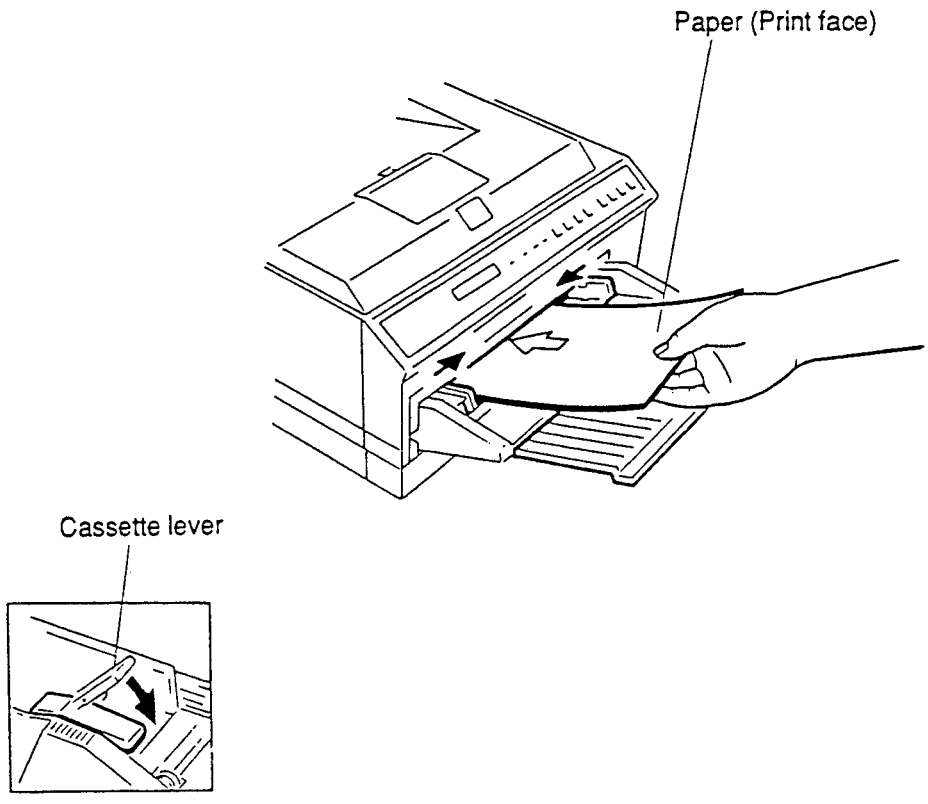


Fig. 2-43 Printing on thick paper

9.5 Two-face printing

Place the unprinted surface of the page up, then insert it in manual feed mode. Refer to Section 9.2.2, "Manual feed printing.")

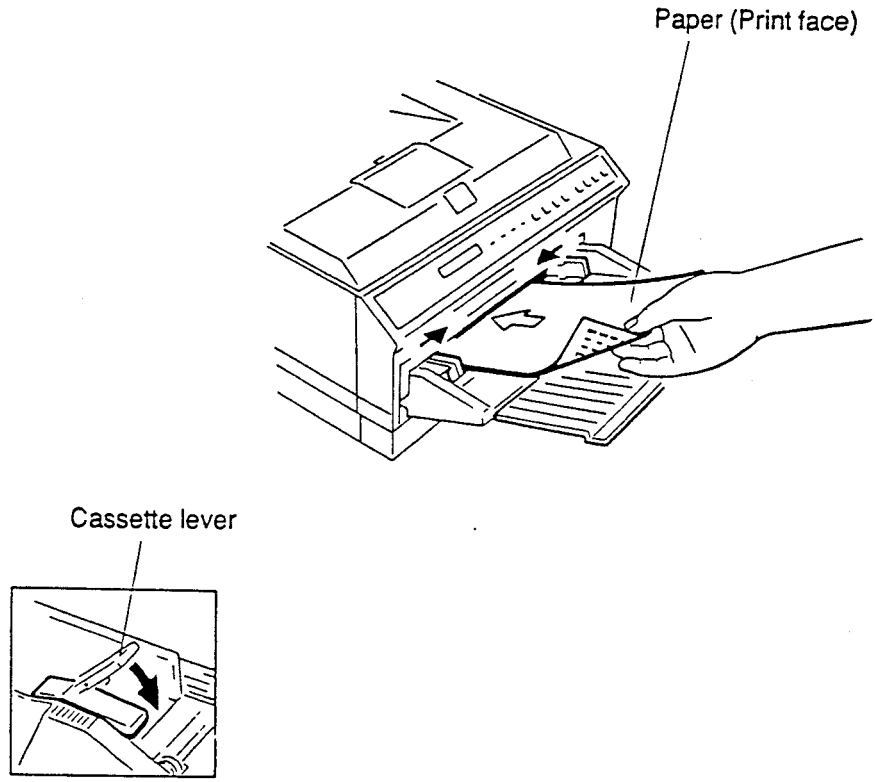


Fig. 2-44 Two-face printing

Notes:
- When printing on both sides, the print quality on the second side is not as good as on the first side.
- This method of printing may also cause jams more readily than with one-sided printing.

10. Maintenance

10.1 Cleaning the printer

The inside of the printer should be regularly cleaned to ensure optimum print quality at all times. This section describes the cleaning intervals, areas and appropriate methods.

CAUTION: Before cleaning, be sure to turn the power switch to OFF and detach the power cord.

Note:
- Place the unit on paper or similar material when cleaning. Since toner cannot be removed easily, be careful not to get your clothes, furniture, etc. dirty with toner.
- Toner is not harmful to the human body. However, if any toner gets you, be sure to wash away the toner immediately.

10.1.1 Cleaning intervals and areas (Periodical cleaning)

(1) When replacing the toner (Every 1,500~2,000 pages of printing), clean the following.

- Transfer charger
- Discharger
- Paper guides
- Developer unit

(2) When replacing the DRUM unit (Every 10,000 pages of printing) or ozon filter (Every 1 year), clean the following.

- Charger
- Transfer charger
- Discharger
- Paper guides
- Developer unit
- Laser beam slit

10.1.2 Periodical cleaning

(1) Charger
Remove the DRUM unit from the printer, and clean the charger wire using a cotton swab.

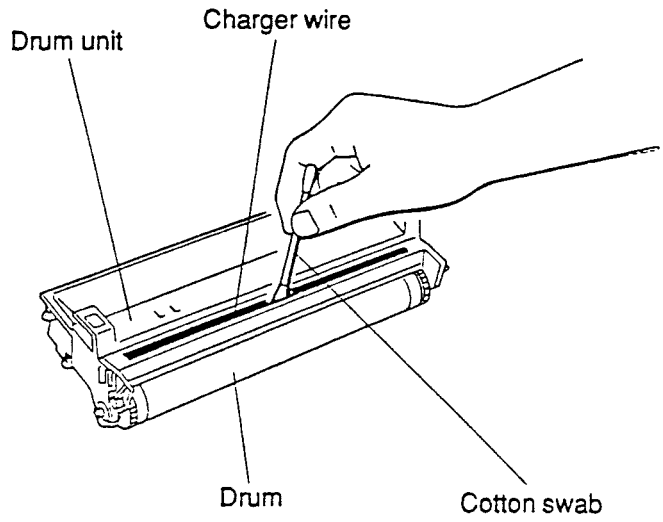


Fig. 2-45 Clean the charger

WARNING:
- When cleaning, take care not to damage the charger wire.
- Do not touch the DRUM surface. Note that the DRUM is sensitive to light.

(2) Transfer charger and discharger

- Remove the developer block from the printer.

WARNING: Wrap the removed developer block in a black cloth etc. to prevent the DRUM from being exposed to light.

- Clean the transfer charger and the discharger using a cotton swab.

WARNING: Take care not to damage the transfer charger and the discharger.

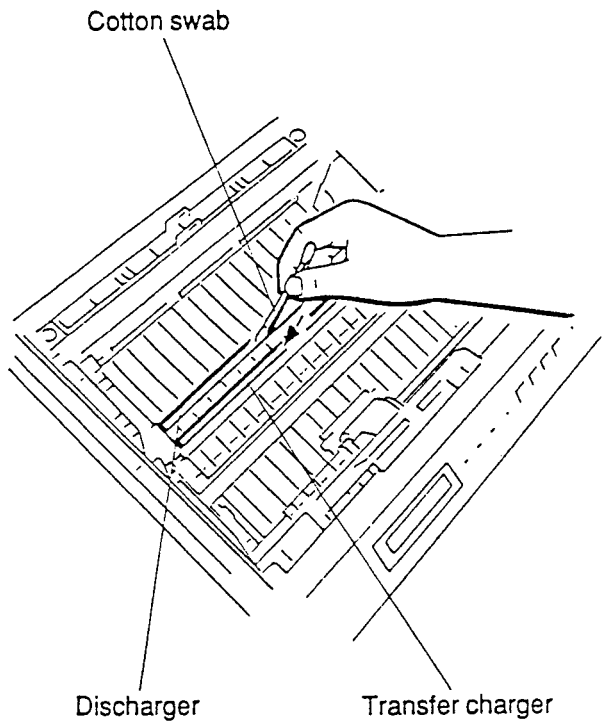


Fig. 2-46 Clean the transfer charger and discharger

(3) Paper guides

- Remove the developer unit from the printer.

WARNING: Wrap the removed developer block in a black cloth etc. to prevent the DRUM from being exposed to light.

- Clean the paper guides using a dry cloth.

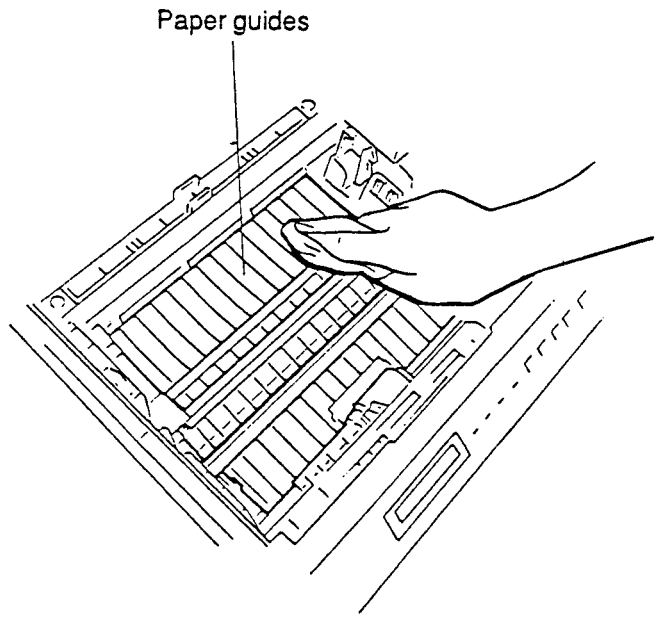


Fig. 2-47 Clean the paper guides

(4) Developer Unit

- Remove the developer unit from the printer.

WARNING: Wrap the DRUM unit in a black cloth etc. to prevent the DRUM from being exposed to light.

- Clean the Mylar sheet of the developer unit using a cotton swab.

WARNING: Do not use alcohol for cleaning.

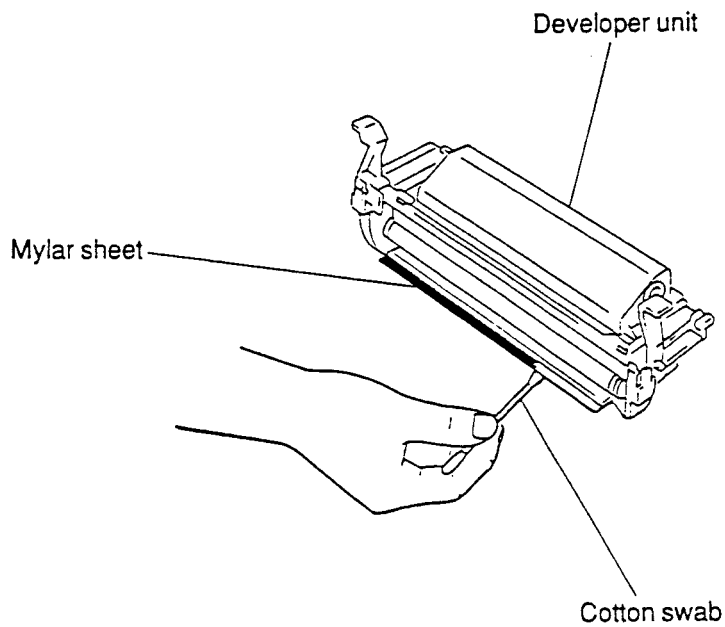


Fig. 2-48 Clean the developer unit

(5) Laser Beam Slit

- Open the top cover and clean the laser beam slit with a lens cleaning cloth.

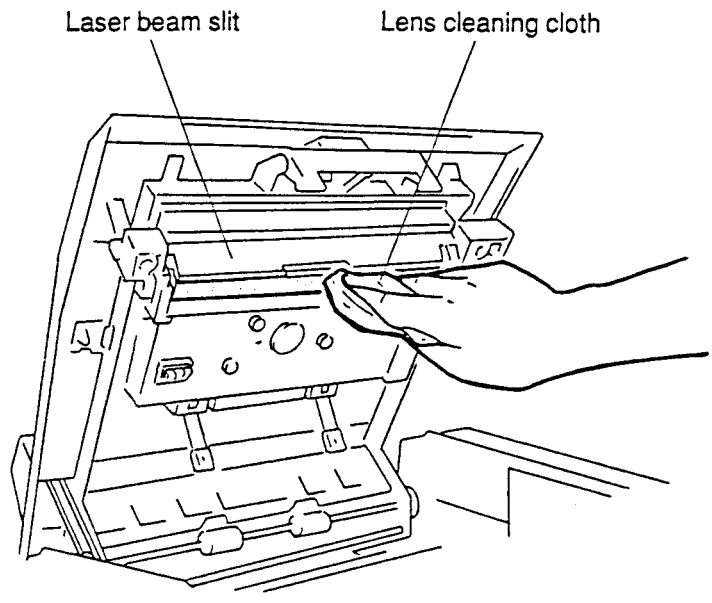


Fig. 2-49 Clean the laser beam slit

10.1.3 Other cleaning points

Besides the periodical cleaning, perform cleaning in the following manner when print quality gets poor (refer to "Troubleshooting")

(1) Developer unit (when white vertical lines appear on printed paper)

- Remove the developer unit from the printer.

WARNING: Wrap the removed DRUM unit in a black cloth etc. to prevent the DRUM from being exposed to light.

- Scrape off dust or dirt between the doctor blade and the magnet roller using the Mylar scraper.

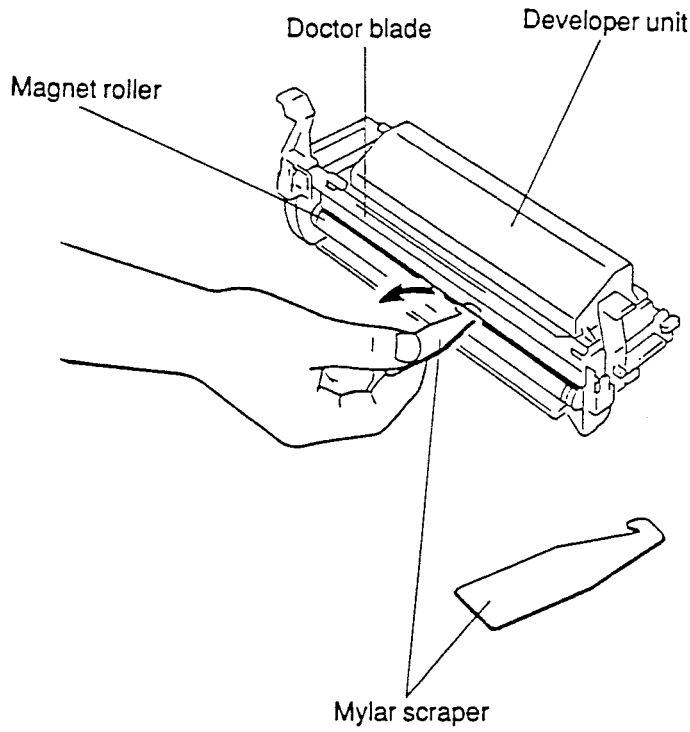


Fig. 2-50 Clean the developer unit

(2) Both ends of the DRUM (when uneven darkness appears on printed paper)

- Remove the DRUM unit from the printer.
- Clean the silver areas on both sides of the DRUM.

WARNING: Do not touch the DRUM surface. Note that the DRUM is extremely sensitive to light and cleaning must be performed as skillfully as possible.

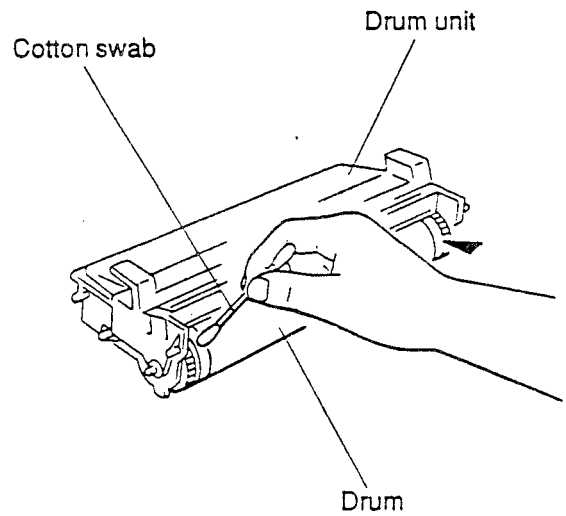


Fig. 2-51 Clean the both ends of the drum

(3) Both ends of the magnet roller (when inconsistent darkness appears on printed paper)

- Remove the developer unit from the printer.

WARNING: Wrap the removed DRUM unit in a black cloth etc. to prevent the DRUM from being exposed to light.

- Clean both ends of the magnet roller using the cotton swab.

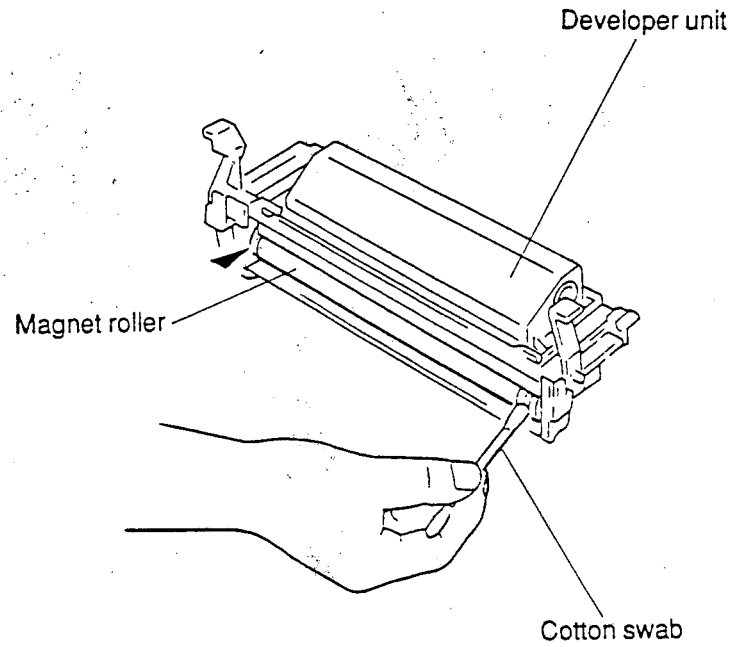


Fig. 2-52 Clean the both ends of the magnet roller

(4) Terminals under the developer block (when the print is blurred)

- Remove the developer block from the printer.

WARNING: Wrap the removed developer block in a black cloth etc. to prevent the DRUM from being exposed to light.

- Clean the silver terminals on the inner side of the printer by using the cotton swab.

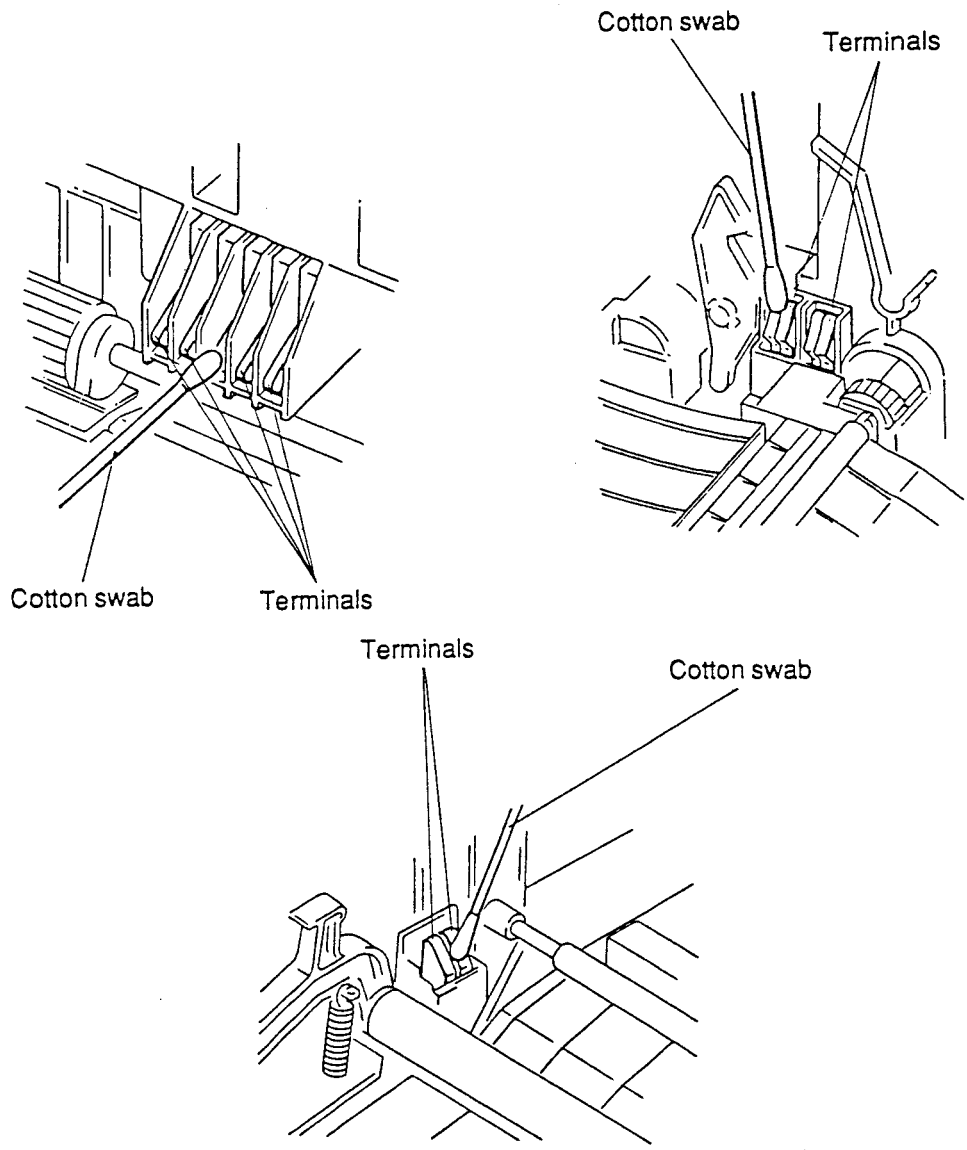


Fig. 2-53 Clean the terminals

10.2 Replacing consumables

This section describes replacement intervals for consumables (toner cartridge, DRUM unit, ozon filter, etc.) and appropriate methods.

10.2.1 Replacement intervals for consumables

The following list shows the approximate intervals at which this printer's consumables will need to be changed.

Consumable	Predicated Page Count
Initial toner cartridge	750 pages (5% printing) 1000 pages (4% printing)
Supply toner cartridge	1500 pages (5% printing) 2000 pages (4% printing)
Cleaning pad	1500 pages (5% printing) 2000 pages (4% printing)
DRUM unit	10,000 pages
DRUM counter	10,000 pages
Ozon filter	1 year

(1) Toner cartridge and cleaning pad replacement interval

Replace the toner cartridge and cleaning pad when the message "TONER EMPTY" is displayed.

(2) DRUM unit and DRUM counter replacement interval

Replace the DRUM unit and DRUM counter when "CHANGE DRUM" is displayed, or when the POWER / DRUM LIFE LED on the operation panel is red.

The change in color of the POWER / DRUM LIFE LED lamp from green to orange (7500 copies) to red (9900 copies) indicates the upcoming need to replace the DRUM unit. At 10,000 copies, the printer stops and displays the message "CHANGE DRUM". Pressing the [ON LINE] key after the "CHANGE DRUM" message will be displayed, however, allow a further 100 copies to be printed. From copy 10,000 to 10,090, press the [ON LINE] key each 10 copies.
From copy 10,091 to 10,100, press the [ON LINE] key for each copy or two.

- Order a new DRUM unit as soon as the POWER / DRUM LIFE LED changes from green to orange.
- Always replace the DRUM unit and DRUM COUNTER at the same time.

(3) Ozon filter replacement interval.
Every 1 year or ozone smells from the printer.

Note: When replacing consumables, always clean in accordance with section 10.1, "Cleaning the Printer."

10.2.2 Replacing the toner cartridge

(1) Open the top cover and remove the developer block.

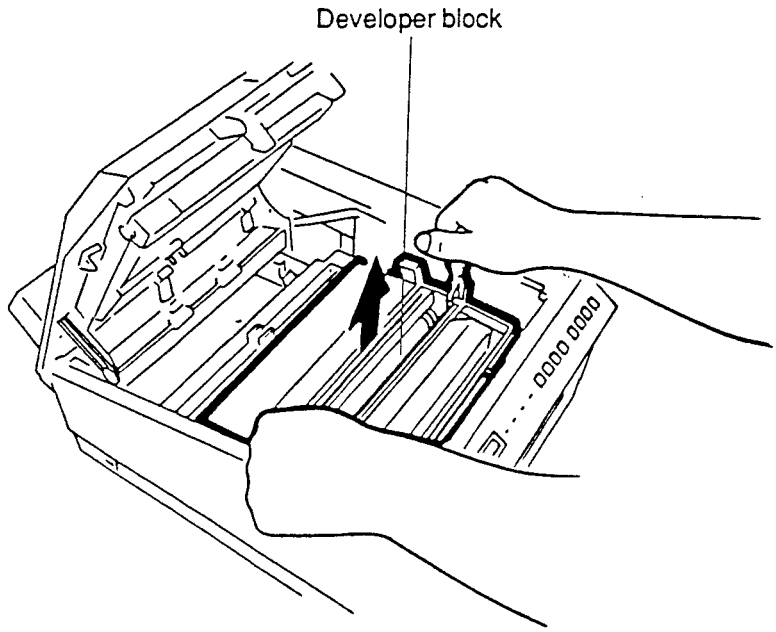


Fig. 2-54 Replacing the toner cartridge

WARNING:
- Wrap the DRUM unit in a black cloth etc. to prevent the DRUM from being exposed to light.
- Do not touch the DRUM surface or the magent roller.

(2) Tap the toner cartridge lightly to make the remaining toner in the cartridge drop into the developer unit. Press the button on the inner left of the developer unit and slide the toner cartridge to the left to disengage it from the developer unit.

Note:
- Some toner may remain in the cartridge. It is recommended to spread some paper etc. under the developer unit.
- Toner cartridges are made of plastics, and therefore empty cartridges should be dumped in proper places.
- Some toner is left in the toner cartridge. Toner is not harmful to the human body. However, if any toner gets you, be sure to wash away the toner immediately. Since toner cannot be removed easily, be careful not to get your clothes, furniture, etc. dirty with toner.

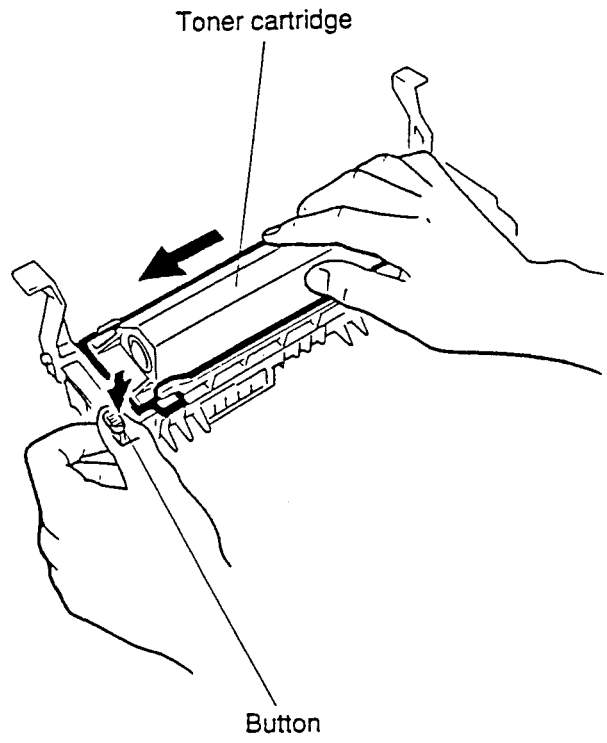


Fig. 2-55 Replacing the toner cartridge

WARNING: Take care to keep the developer unit away from hair and dust. Hair or dust may impede proper toner supply.

(3) Shake the new toner cartridge right and left 4 or 5 times.
Then align the four hooks on a new toner cartridge with the slots in the developer unit, fit the cartridge to the unit, then move the cartridge to the right until the button pops up.

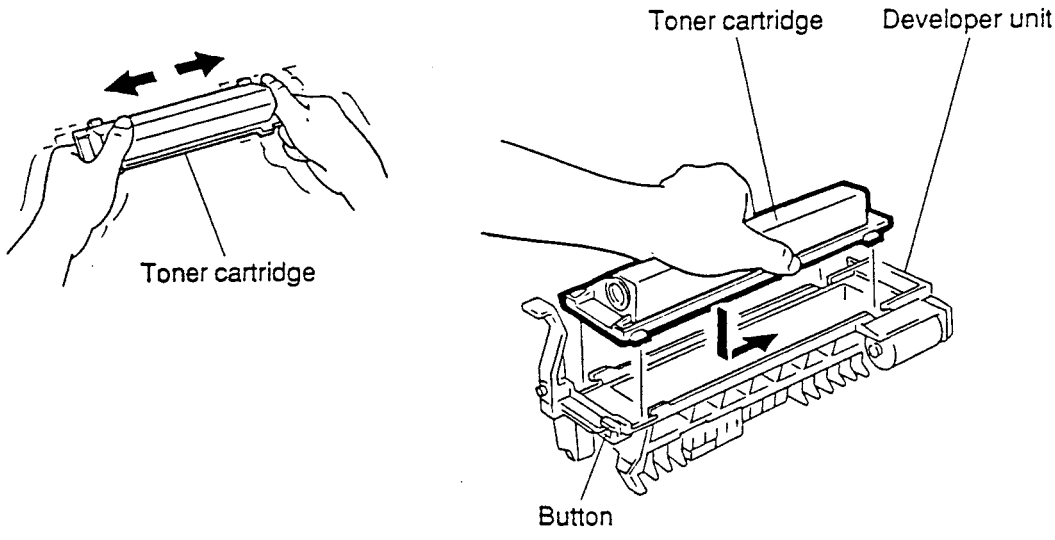


Fig. 2-56 Replacing the toner cartridge

(4) Pull the film out horizontally while holding the toner cartridge securely.

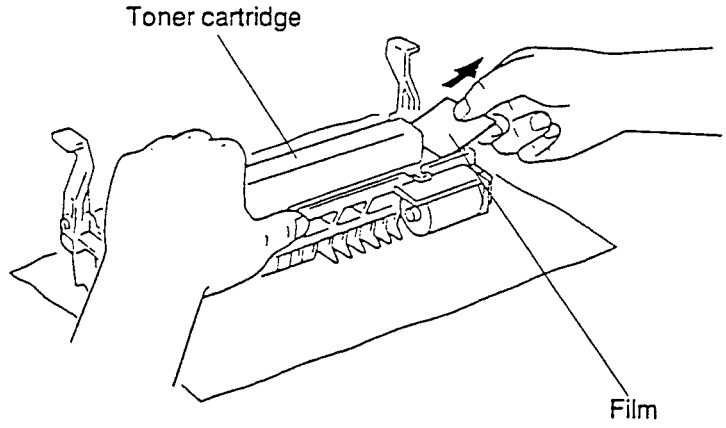


Fig. 2-57 Replacing the toner cartridge

Notes:
- Use only designated toner.
- Perform periodical cleaning when replacing the toner cartridge. Refer to 7.1 Cleaning the Printer.
- Toner is adhering to the film to be removed from the toner cartridge. Toner is not harmful to the human body. However, if any toner gets you, be sure to wash away the toner immediately. Since toner cannot be removed easily, be careful not to get your clothes, furniture, etc. dirty with toner.

(5) Align the positioning shafts on both sides of the developer block with the frame and fit the developer block to the frame.

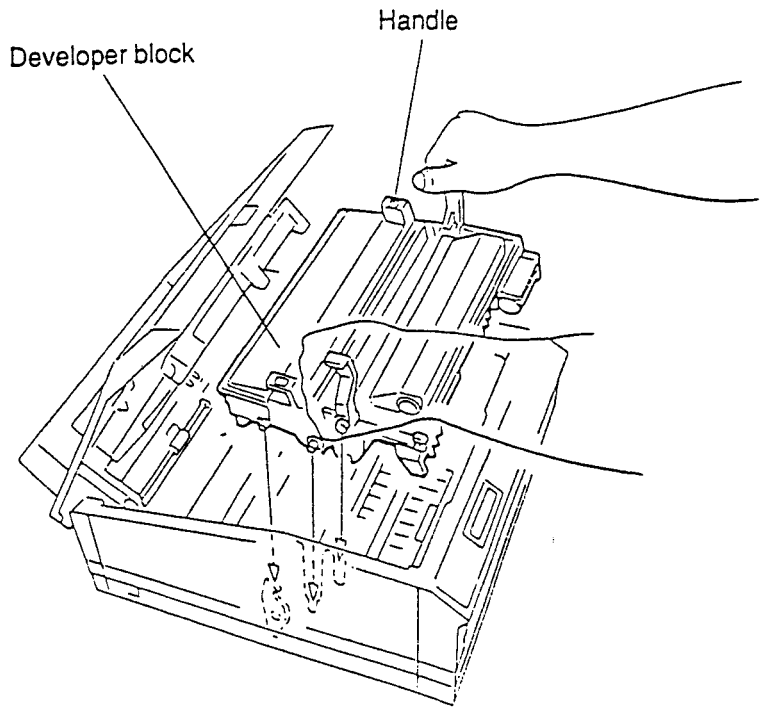


Fig. 2-58 Replacing the toner cartridge

Note: When installing the developer block, push the handles (green) on both sides of the developer block against the hooks of the printer frame until they latch securely.

(6) Close the top cover.

10.2.3 Replacing the cleaning pad

(1) Open the top cover and replace the cleaning pad.

CAUTION: Note that the heater unit is extremely hot when the printer is operating.

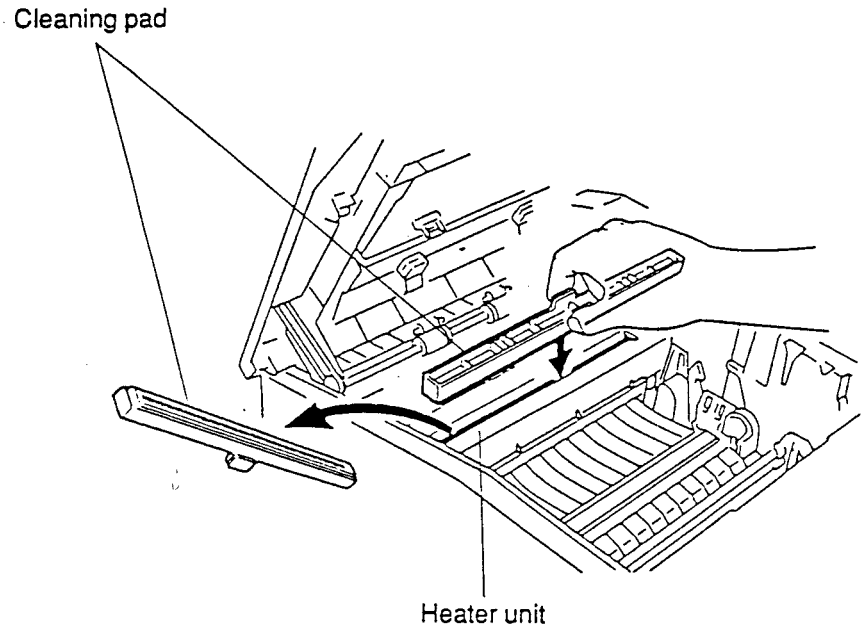


Fig. 2-59 Replacing the cleaning pad

WARNING:
- Note that the DRUM unit is extremely sensitive to light.
- Take care that dirt from the cleaning pad does not drop inside the printer.

Note:
- Perform periodical cleaning when replacing the cleaning pad. Refer to 10.1 Cleaning the Printer.
- Used cleaning pads should be dumped in proper places where plastic items are to be dumped. Used cleaning pads are contaiminated with toner. Toner is not harmful to the human body. However, if any toner gets you, be sure to wash away the toner immediately. Since toner cannot be removed easily, be careful not to get your clothes, furniture, etc. dirty with toner.

(2) Close the top cover.

10.2.4 Replacing the DRUM unit

WARNING: Before replacing the DRUM unit, be sure to turn the power OFF.

(1) Open the top cover and remove the developer block.

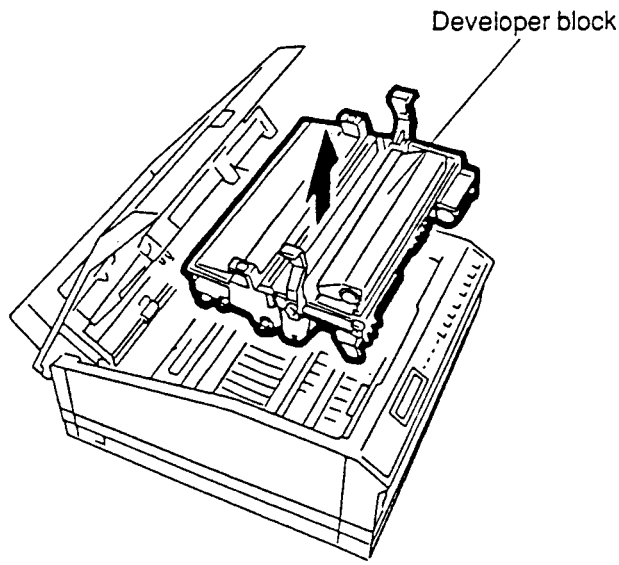


Fig. 2-60 Replacing the drum unit

(2) Separate the DRUM unit from the developer unit.

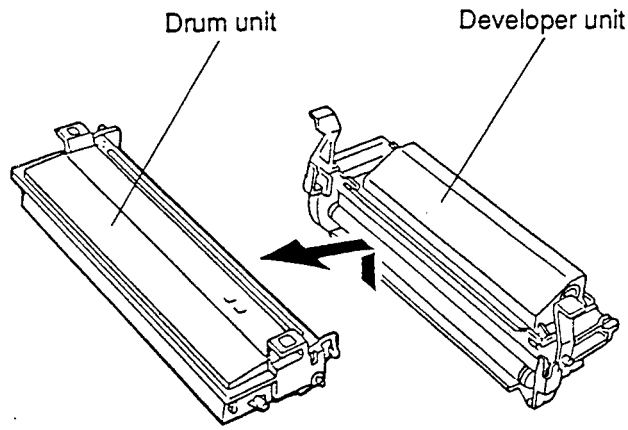


Fig. 2-61 Replacing the drum unit

Note: Used DRUM units should be dumped in proper places where metalic items are to be dumped.

(3) Take out the new DRUM unit and clean the charger wire with a cotton swab.

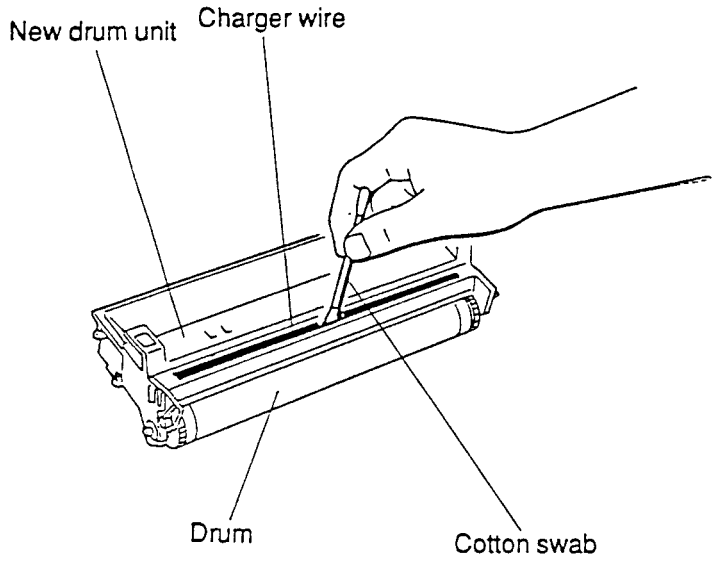


Fig. 2-62 Replacing the drum unit

WARNING:
- Do not touch the DRUM surface.
- Note that the DRUM is extremely sensitive to light.
- Take care not to damage the charger wire.

(4) Hook the new DRUM unit to the developer unit.

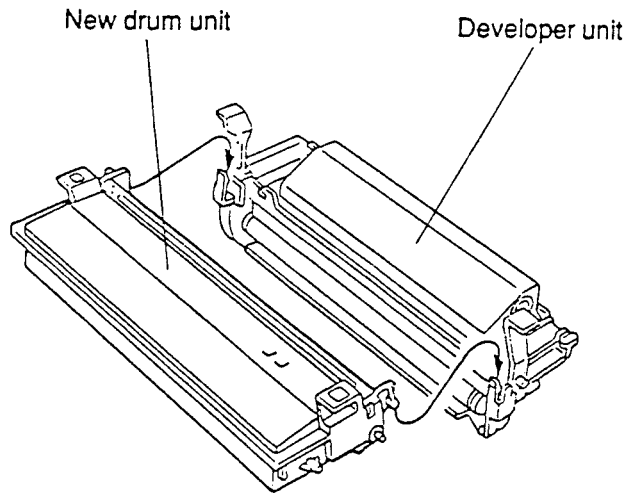


Fig. 2-63 Replacing the drum unit

WARNING: Do not touch the DRUM surface or the magnet roller.

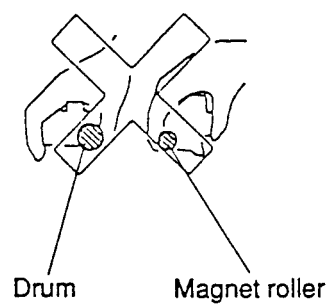


Fig. 2-64 Replacing the drum unit

Note: Perform periodical cleaning when replacing the DRUM unit. Refer to 10.1 Cleaning the Printer.

(5) Replace the DRUM counter.
Insert the DRUM counter as shown below. Make sure to press it down the way until the red line pointed by the arrow can be seen.

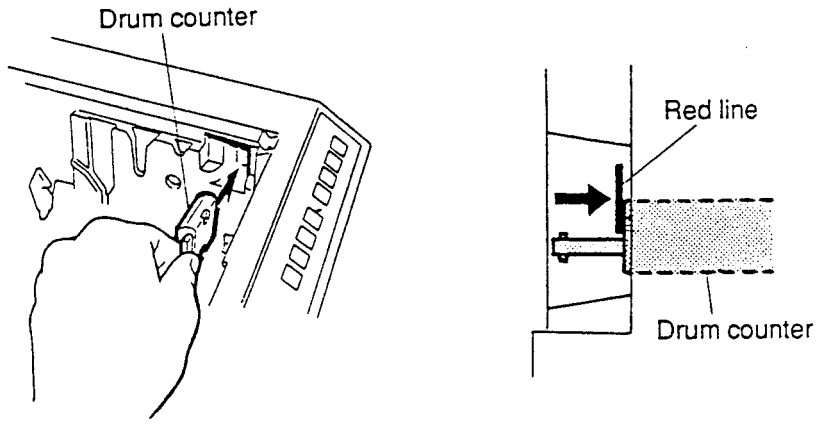


Fig. 2-65 Replacing the drum counter

Notes: • The DRUM counter and DRUM unit must always be replaced together.
• The printer will not operate unless the DRUM counter is installed.

(6) Install the developer block in the printer and close the top cover.

10.2.5 Replacing the ozone filter

Ozone is generated in the printer since high voltage is used at printing process.
The ozone filter is mounted on the right frame inside the printer. Replace the ozone filter every year.
When the printer prints a large amount, we recommend replacing the ozone filter in advance.
If ozone strongly smells from the printer, replace the ozone filter immediately.

Replacing Procedure

(1) Open the top cover and remove the developer block from the printer.

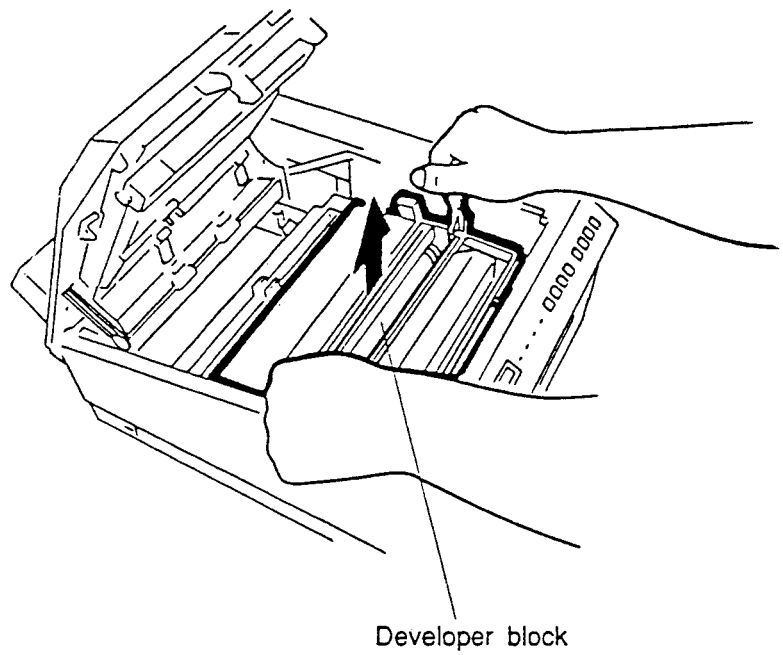


Fig. 2-66 Replacing the ozone filter

WARNING: Wrap the removed developer block in a cloth etc. to prevent the DRUM from being exposed to light.

(2) Open the ozone filter case on the right frame inside the printer to remove the ozone filter.

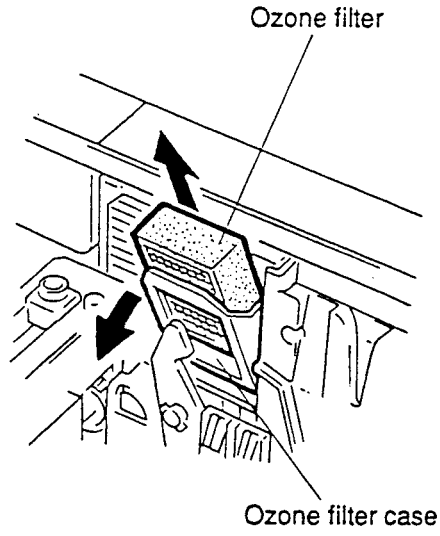


Fig. 2-67 Replacing the ozone filter

Warning: The ozone filter is a fragile part. Take care not to damage the ozone filter when replacing.

(3) Mount a new ozone filter and close the ozone filter case.

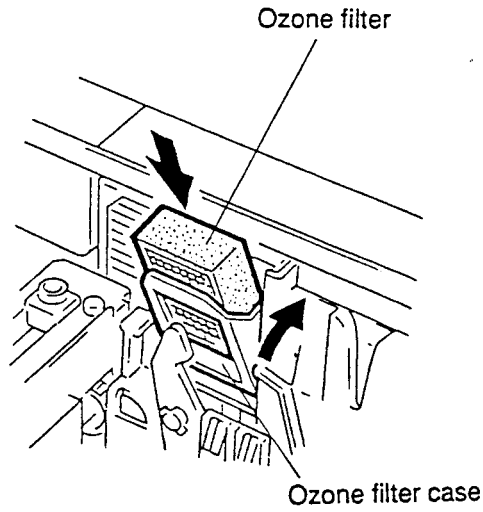


Fig. 2-68 Replacing the ozone filter

(4) Install the developer block in the printer and close the top cover.

Note: Perform the periodical cleaning when replacing the ozone filter.
Refer to 10.1 Cleaning the printer

10.3 Service maintenance

After printing 80,000 pages, this printer requires service maintenance to maintain specified performance. The printer displays a message when service maintenance is required. If the message "MAINTENANCE" is displayed, contact a service technician for service maintenance.

10.4 Transporting your printer

10.4.1 Moving the printer to a nearby location

The printer can be moved as it is to a nearby location (within the same room or to a nearby room).

Note: If the printer is tilted, toner may leak from the developer unit. The printer must be moved horizontally.

10.4.2 Shipping the printer

When shipping the printer, the printer body and its accessories must be packed.
If your carton or packing material is lost, contact your nearest service center.

Note: Before transporting the printer, remove the developer unit from the printer. This prevents toner in the developer block from dropping inside the printer.

Packing the printer requires all the original packing materials. Two large plastic bags are also necessary to wrap the DRUM unit and developer unit to prevent toner from dropping during transit.

The printer should be packed in the following manner.

(1) Turn OFF the power switch and detach the power cord.

(2) Remove the paper cassette. Remove the optional items such as the face up tray or 2nd-bin feeder, and pack them using the original packing materials.

(3) Remove the developer block, cleaning pad, and DRUM counter from the printer.

(4) Wrap the DRUM unit in the original black wrapper or a black cloth etc. to prevent it from being exposed to light. Then, put the DRUM unit in a plastic bag and seal the bag.

WARNING: Do not touch the DRUM surface.

(5) Put the developer unit in a plastic bag and seal the bag. This prevents toner from leaking out of the developer unit and staining the printer.

(6) Attach the original packing materials in the printer.
Refer to 5.2 Unpacking.

(7) Pack the printer body and parts in the packing carton referring to 5.2 Unpacking.

NMS1474
CHAPTER:3- FUNCTIONAL DESCRIPTION

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1. Basic Operation

1.1 Functional configuration

This printer consists of the following three sections: the laser scanner section, print section, and control section.
The laser output section performs laser output using the laser diode and laser beam scanning using the polygon motor and polygon mirror. The print section performs actual print operations including paper feed, image transfer to the paper, and fixing. The control section performs all electrical control for processing of the data sent from the host to printing out.

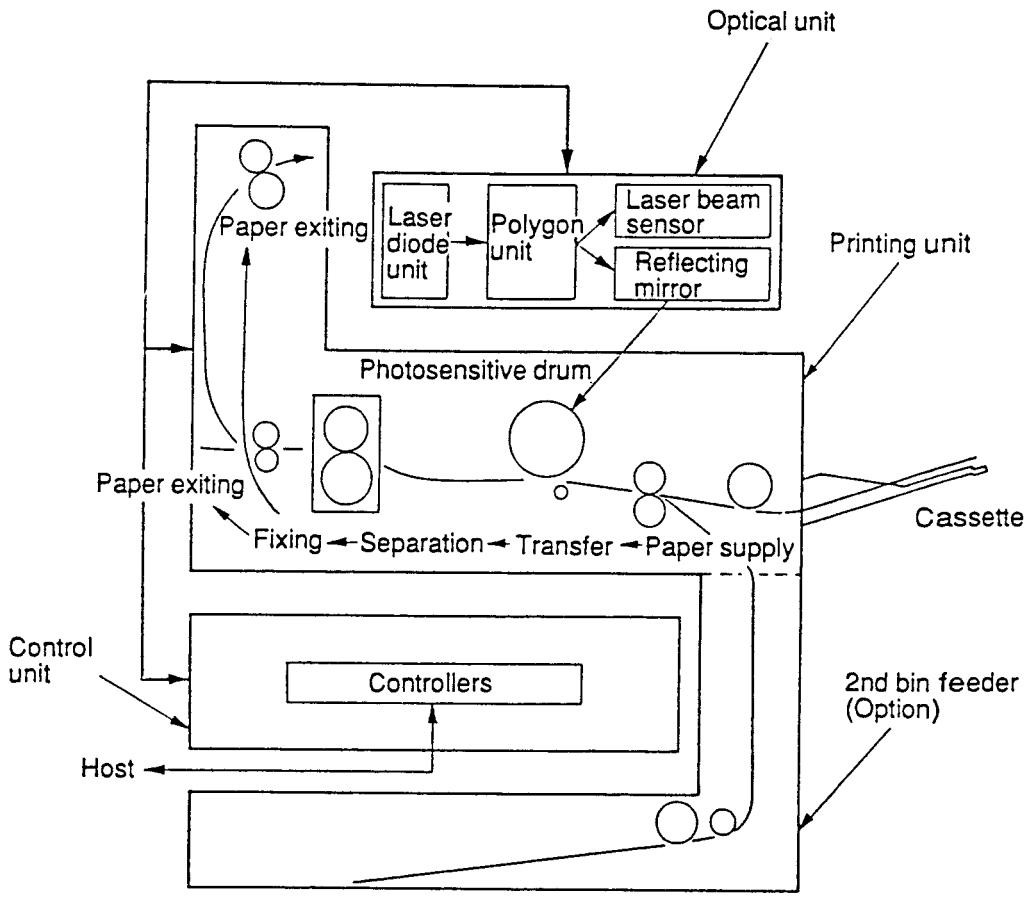

Fig. 3-1

1.2 Basic driving forces

This printer is operated by the following three motors: the polygon motor, magnet motor, and main motor.
The polygon motor turns the polygon mirror for laser beam scanning. The magnet motor turns the magnet roller, slave roller, and rummage motor to stir toner in the developer unit and feeds it out. The main motor turns the rollers for paper feed, the drum, and the heat roller. The three motors are controlled by the mechanical controller.

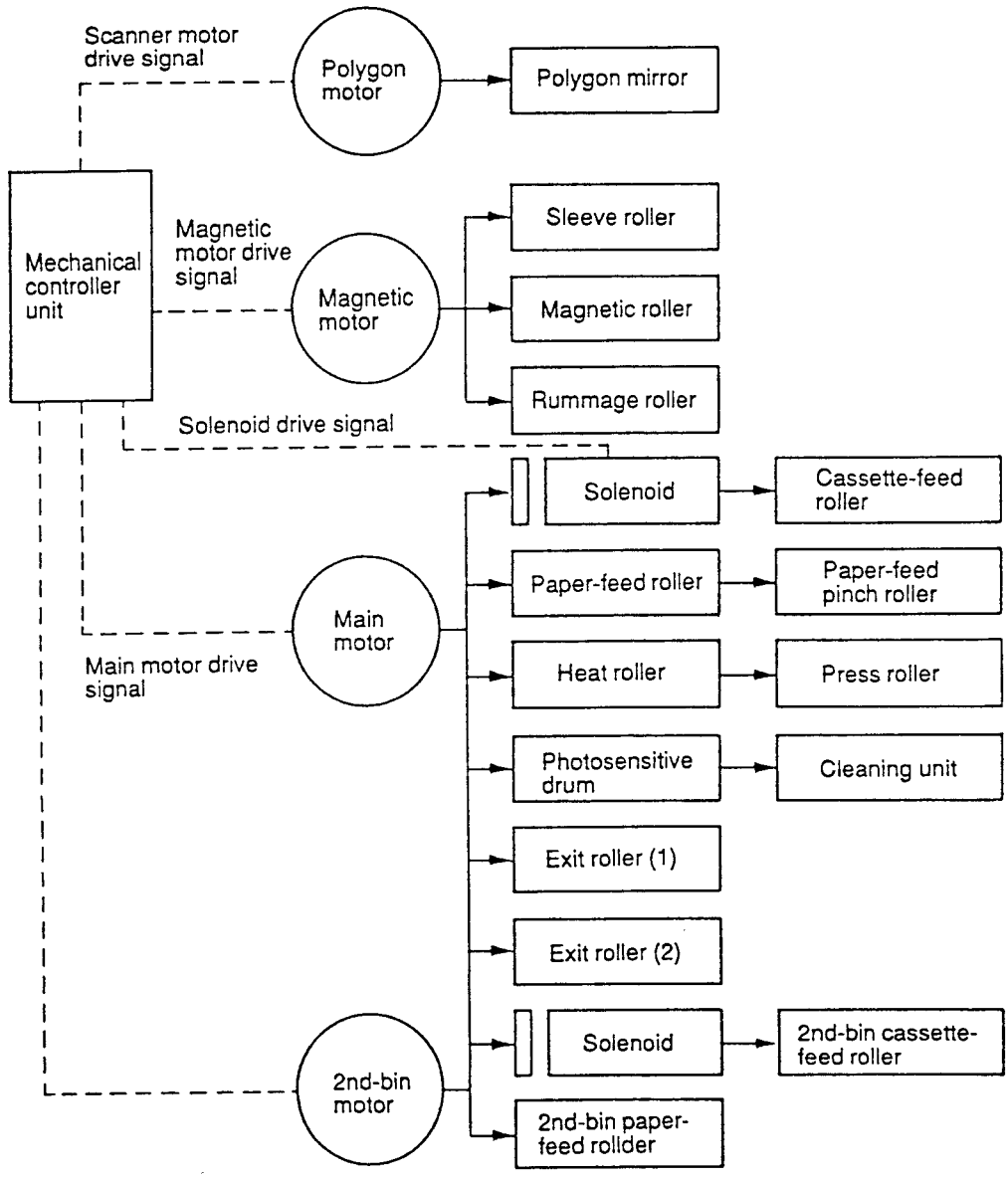

Fig. 3-2

1.3 Basic sequences

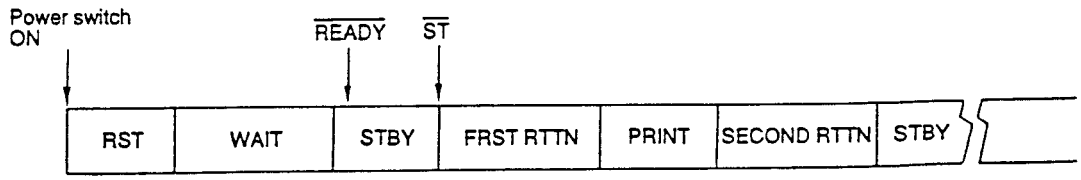

Fig. 3-3

(1) Reset (RST)
When the power switch of this printer is set to ON, the printer simultaneously enters its initialization status.

(2) Wait (WAIT)
This refers to the period after the power switch is set to ON until the surface temperature of the heat roller reaches its specified temperature. WAIT ordinarily ends within approximately 60 seconds.

(3) Stand by (STBY)
This refers to the status in which printing is enabled after the wait period ends. Furthermore, when the mechanical controller receives the print start command, the first rotation that is indicated as the next sequence is performed.

(4) First rotation (FRST RTTN)
When the main motor, the polygon motor, and the magnetic motor are activated, the discharge lamp simultaneously lights and cleaning of the photosensitive drum is performed.

(5) Print (PRINT)
The laser beam is modulated by the input of a video signal to the mechanical controller and it then begins scanning the top of the photosensitive drum.

(6) Second rotation (SECOND RTTN)
After printing is terminated, the photosensitive drum is rotated again to prepare for the next printing operation.
Furthermore, elimination of the residual toner that remains on the photosensitive drum is performed.

2. Laser Scanner Section

2.1 Outline

The laser scanner section is composed of the polygon part, laser diode part, and reflecting mirror part.
Upon receipt of the control signal from the mechanical controler, the scanner section outputs a laser beam from the laser diode. The laser diode part changes the laser beam to parallel rays through the collimator and the slit plate. A laser beam of parallel rays arrives at the polygon part. The polygon part turns the polygon mirror at a uniform rate for laser beam scanning.
The two reflecting mirrors bend the optical path of the scanned laser beam, and then it is focused on the drum.

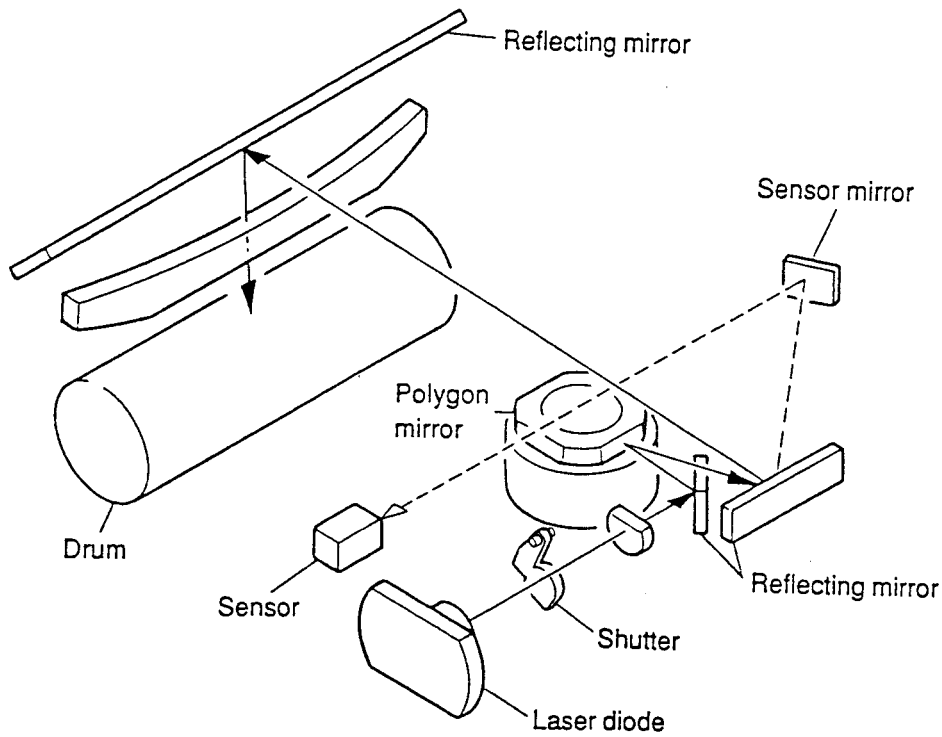

Fig. 3-4

2.2 Image formation

An image is formed as a laser beam is turned ON and OFF, scanning is performed by the polygon mirror, and the drum turns. The laser beam is turned ON and OFF according to the control signal from the mechanical controller. The polygon mirror causes the laser beam to scan to generate light lines moving horizontally. The scanning laser beam is applied to the drum through the reflecting mirror.

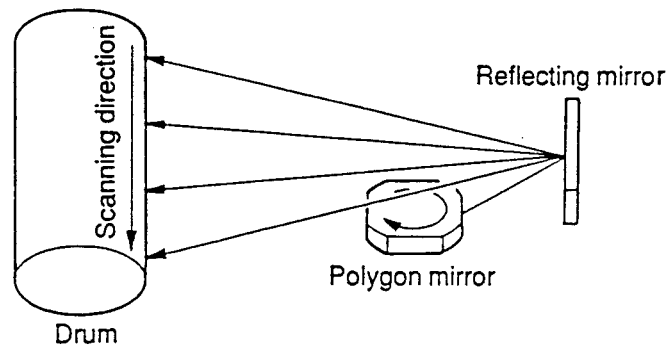

Fig. 3-5

The drum is also turning at a uniform rate while the laser beam is scanned by the polygon mirror. Thus, the laser beam from the polygon mirror is applied to the drum surface at certain intervals.
In this way, the laser beam output from the laser diode is converted into lines. A laser beam of lines are converted into a plane to form an image on the drum.

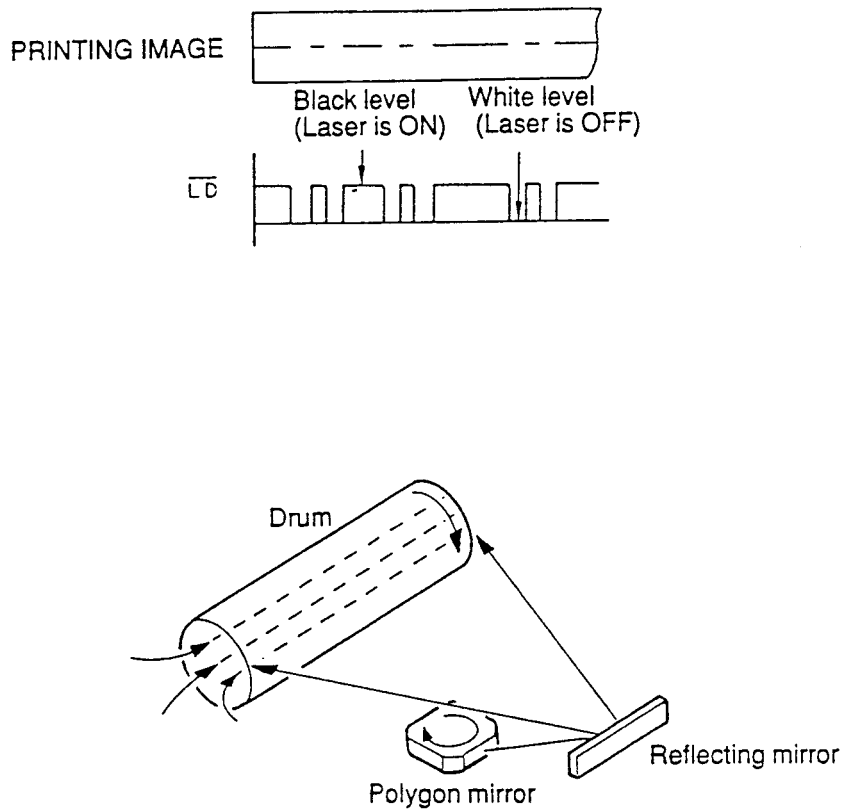

Fig. 3-6

2.3 Polygon drive

The main part of the optical unit is the polygon mirror.
This mirror is attached to the shaft of the polygon motor, and it rotates according to the rotation of the polygon motor.
Rotation speed is controlled by the sensor driver which is located inside the optical unit.
The laser beam that is reflected by the polygon mirror there by scans the drum at a constant rate.

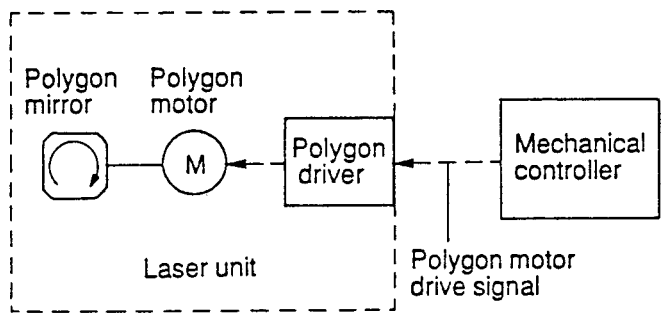

Fig. 3-7

3. Printing Section

3.1 Outline

The printing section is the mechanism that prints the image onto the drum surface, using electrophotography.
The printing section comprises the image-forming system, the paper supply and feed systems, and the fixing system.

3.2 Electrophotography process

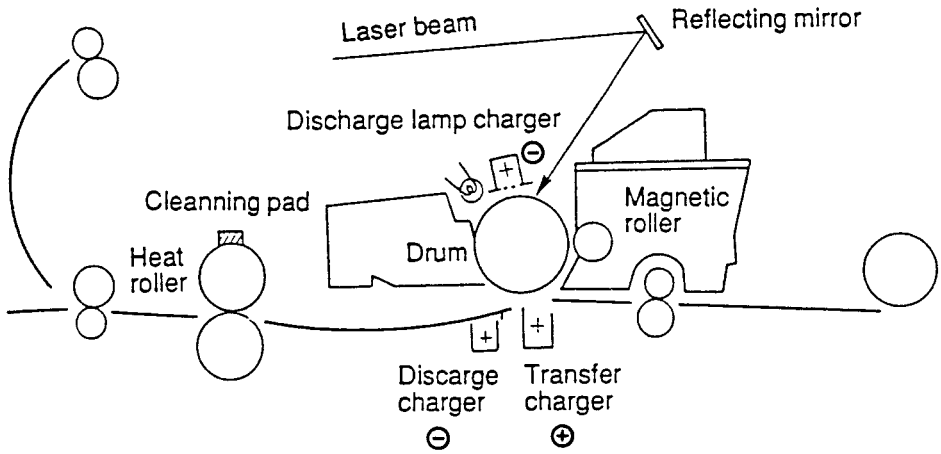

Fig. 3-8

3.2.1 Electrostatic latent image-forming part

This part included 3 steps and forms the electrostatic image on the drum.
When the operations of this part are completed, a negative electrical charge remains on the drum surface that has not been exposed to the laser beam.
The negative electrical charge is dissipated from the surface area of the drum that has been exposed to the laser beam. Since the image that is formed on the drum surface according to the negative electrical charge cannot be seen directly by the human eye, this is called an electrostatic latent image.

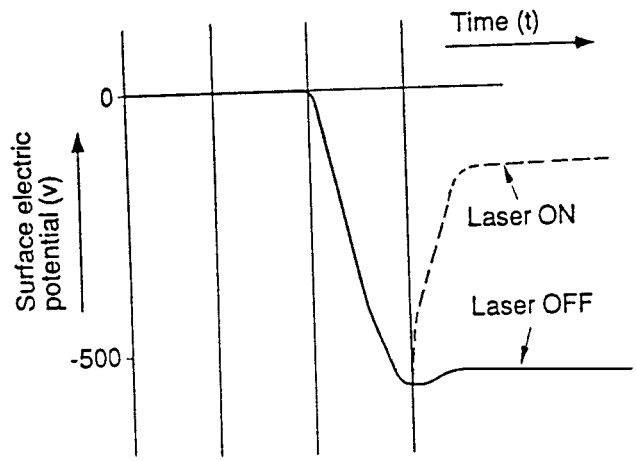

Fig. 3-9

(1) Electrostatic discharge
This process maintains the quantity of the positive electrical charge that has accumulated on the drum surface according to the electrostatic charge, that results from performing the next process.

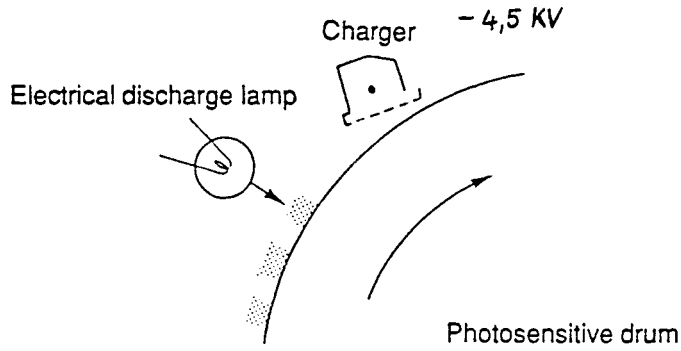

Fig. 3-10

(2) Electrostatic charge
A negative electrical charge is applied to the charger wire which is located inside the charger unit. By using corona discharge, a negative electrostatic charge is applied equally over the drum surface.
A grid is used to ensure that the negative electrostatic charge is applied to the drum.

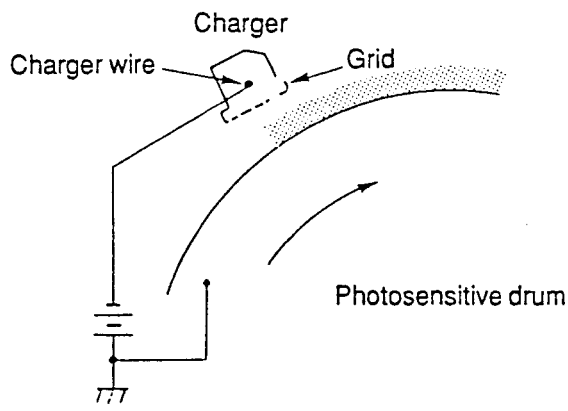

Fig. 3-11

(3) Exposure
This printer utilizes an organic photoconductor (OPC) for the drum. As shown in Fig. 3-12 this OPC is configured by a carrier transport layer (CTL) and a carrier generation layer (CGL).

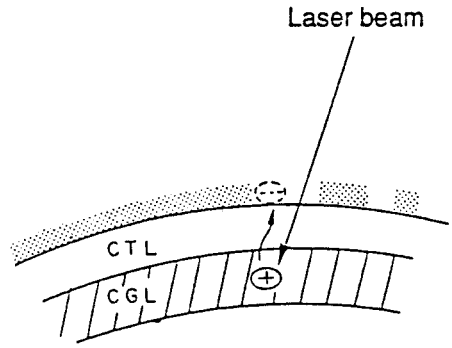

Fig. 3-12

When the OPC drum has been irradiated by the laser beam, a positive electrical charge is generated on the CGL layer.
The positive electrical charge that is thereby generated on this layer is transferred from the CTL layer to the drum surface and is thus combined with the negative electrical charge that has been charged as a result of application of the laser beam.

As has been described above, the drum surface is charged evenly by irradiation by the laser beam.
This results in the formation of a negative electrical image which cannot be seen the human eye.

3.2.2 Developing part

This part transforms the negative electrical image on the drum that is visible to the human eye by using toner (dual-ingredient developing agent).

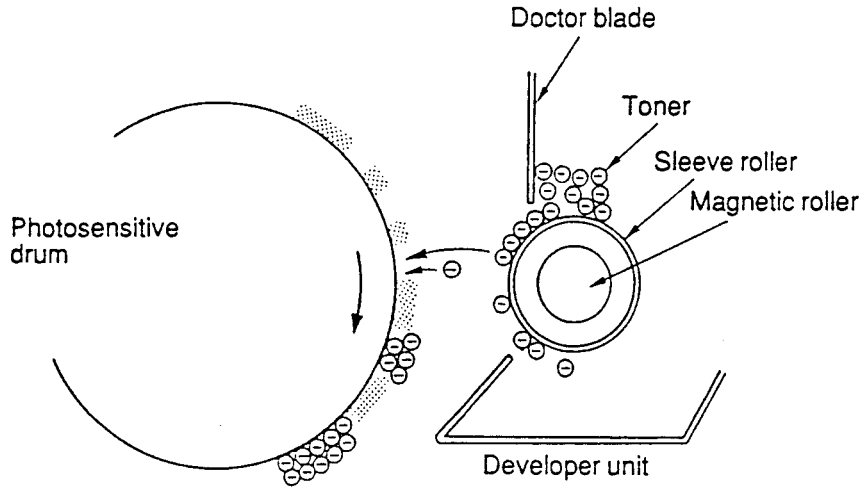

Fig. 3-13

The developer unit is configured by the magnetic roller which rotates at a high speed, the sleeve roller which is located on the outside of the magnetic roller, and the doctor blade.
The main components of the toner are a magnetic powder and a resin and are given a negative charge by the friction. Therefore, the toner adheres to the drum on the areas which have been irradiated by the laser beam and so creates a visible image.

3.2.3 Transfer part

This part transfers the toner image which has been formed on the drum surface to the paper.

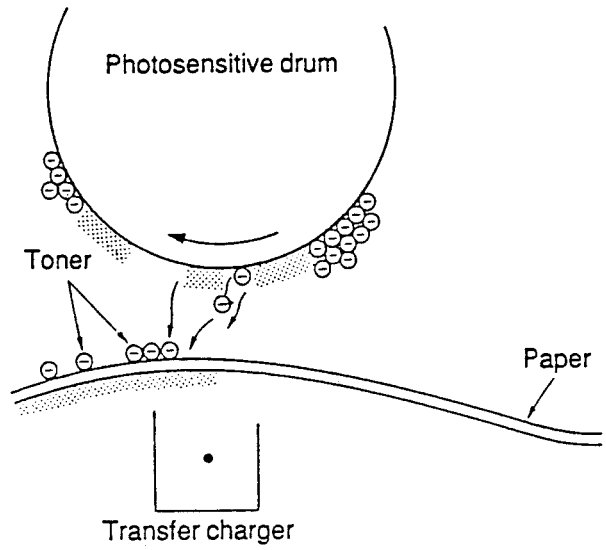

Fig. 3-14

A positive charge is given to the charger wire inside the charger and the image on the drum surface is transferred to the paper using corona discharge.

3.2.4 Paper exit part

This part cancels the positive charge on the back of the paper that results from its passing through the transfer part.

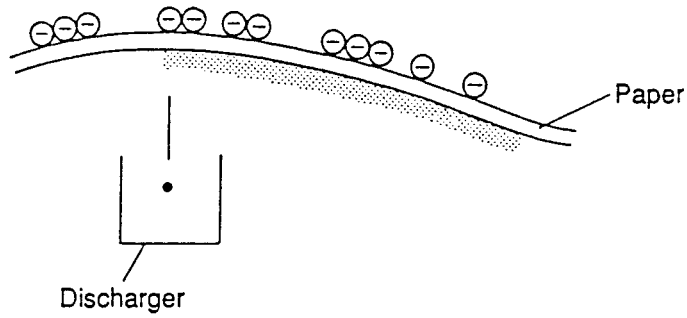

Fig. 3-15

As in the electrostatic charging process, a negative charge is applied from the back of the paper to the charger wire and the positive charge on the paper cancelled by corona discharge.

3.2.5 Fixing part

The image which has been transferred to the paper in the transfer part only adheres to the paper through the force of static electricity. The image would be corrupted if touched by hand. Therefore the toner is firmy deposited on the paper to form a permanent image by the application of heat to both the toner and the paper.

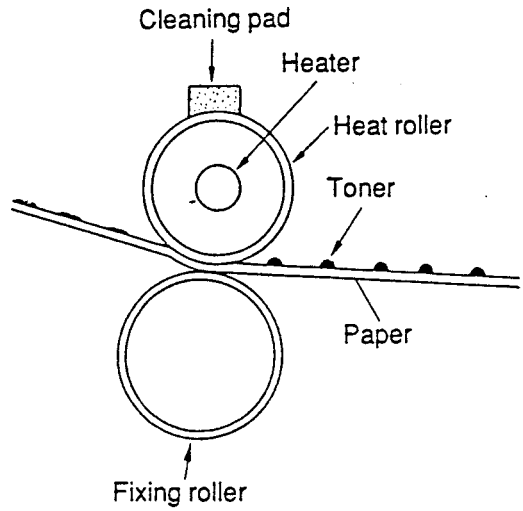

Fig. 3-16

A teflon coating which has superior adhesive surface lubricating properties is applied to the heat roller surface. In order to prevent winding or coiling of the paper, the cleaning pad contains silicon oil.
This is applied to the heat roller in small quantities each time the roller turns.

3.2.6 Cleaning part

The cleaning blade which is located inside the cleaning part scrapes off the residual toner that adheres to the drum surface in preparation for the next printing operation.

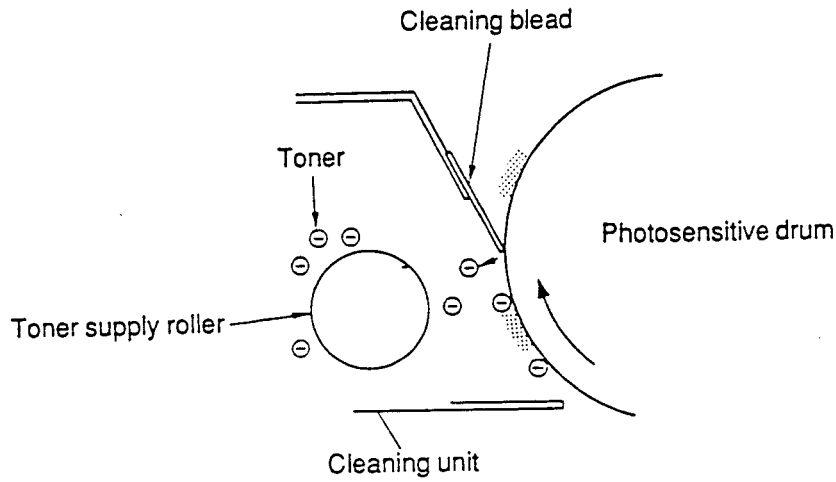

Fig. 3-17

3.3 Supplementary processes

- **Ozone filter**

  In order to prevent leakage to the outside of the ozone that is generated from each charger, a catalytic filter is provided for the decomposition of the ozone.

4. Feeding

4.1 Outline

There are the following three methods of feeding paper including an option. Auto feed and manual feed using the supplied paper cassette use the same paper feed timing and the same path.

There are the following two ways to eject the paper: face up and face down. Either mode can be selected according to the usage of the paper purpose, regardless of the paper feed method.

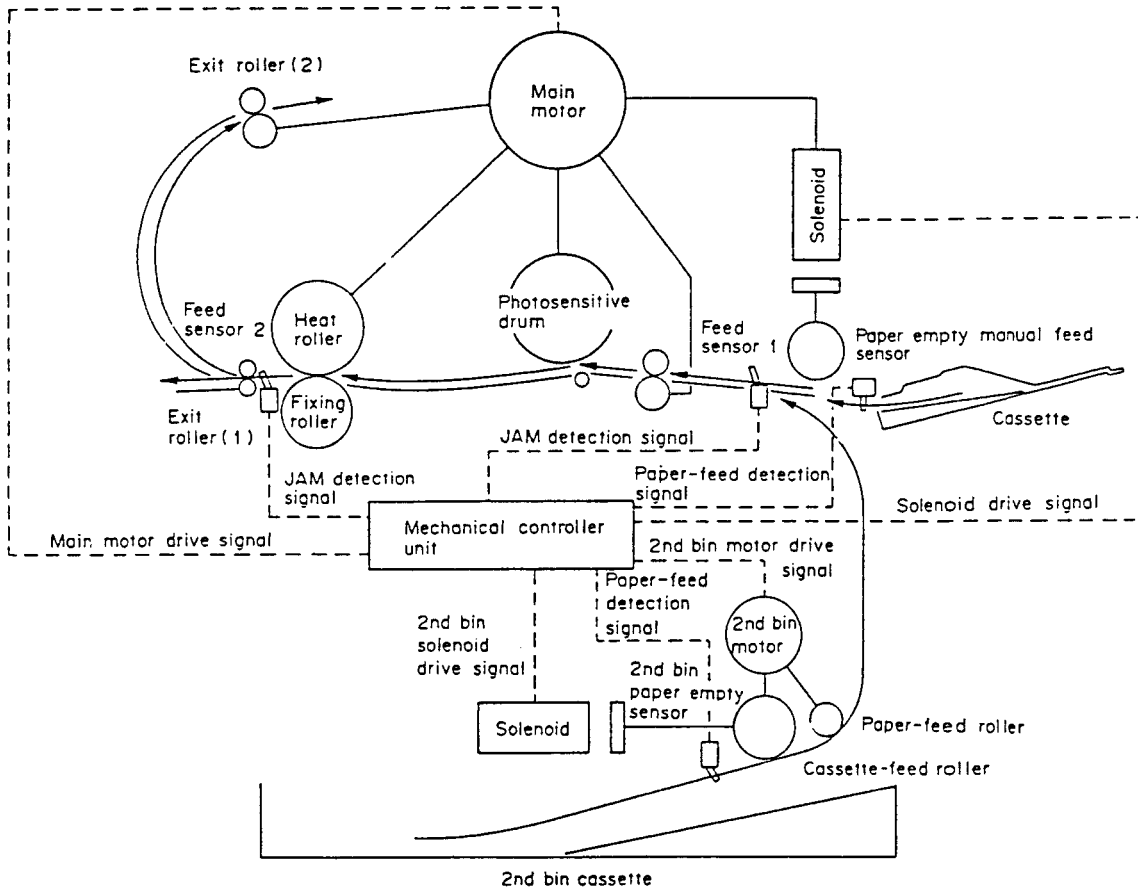

Fig. 3-18

4.2 Paper feeding

Paper feeding is all driven by means of the main motor. When printing, this machine checks for various errors (paper empty, toner empty, paper jam, etc.) to ensure that there are no errors, and then drives the main motor. At this time, power is transmitted to all the gears but power to the cassette roller only is stopped by the clutch. The clutch is disengaged with the timing to align the image on the drum with the printing position on the paper.

The controller section draws the clutch solenoid, according to the speed of the drum beginning to turn through the main motor, to disengage the clutch. At this time, the paper begins to be fed. The paper is fed and ejected outside through the cassette feed roller, paper feed roller, heat roller, and exit rollers.

NMS1474
CHAPTER:4- ELECTRICAL DESCRIPTION

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1. Outline

The engine of this machine is controlled by the controller section. The mechanical controller in the controller section monitors the status of the engine by receiving the signals from the various sensors. By receiving the various control signals from the main controller and the operation panel, the mechanical controller also controls the electrical parts of the engine for printing.
The power unit of this machine is made up of the following two power supplies: the main power supply and high-voltage power supply. The main power supply delivers power to the controllers, motors, sensors, and heater unit. The high voltage power supply feeds power to the chargers.

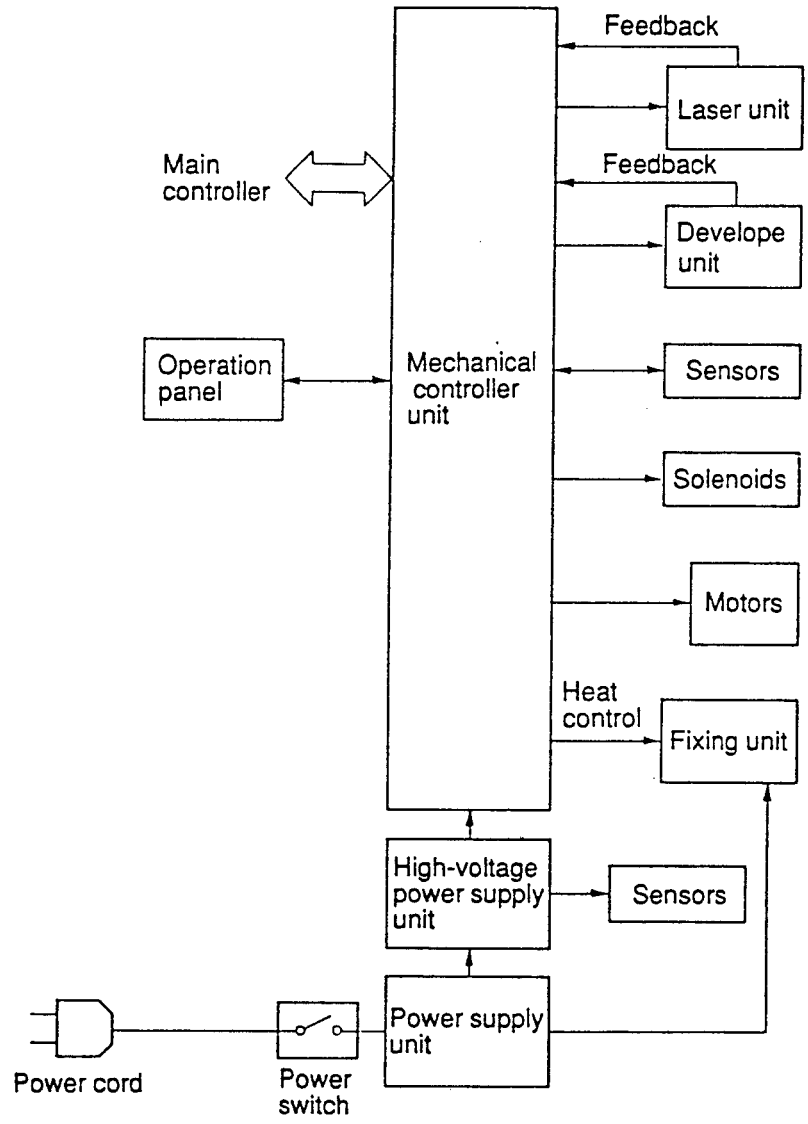


Fig. 4-1

2. Layout Diagram of Electronic Parts

2.1 PC boards

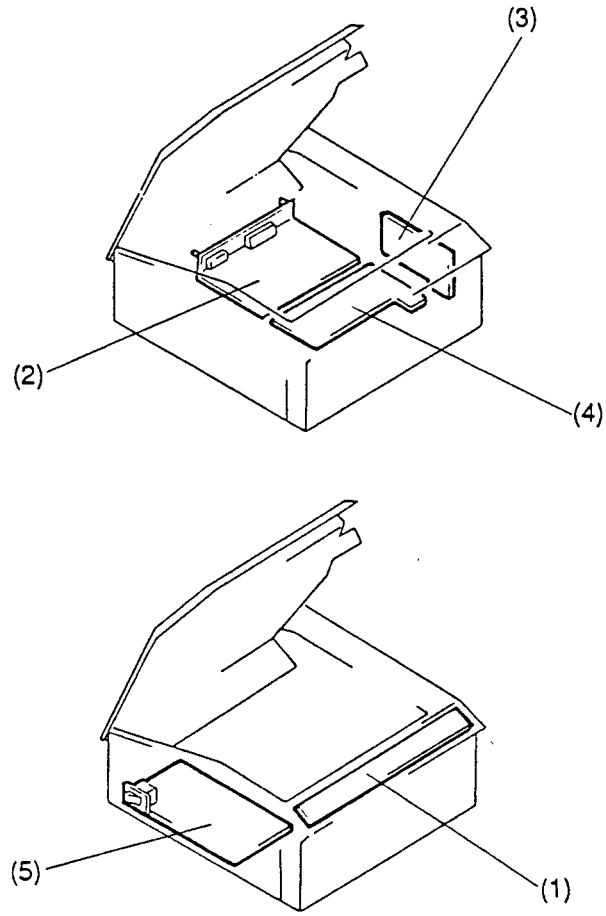


Fig. 4-2

(1) Operation panel PC board
(2) Main controller PC board
(3) Mechanical controller PC board
(4) High voltage power supply PC board
(5) Main power supply PC board.

2.2 Sensors

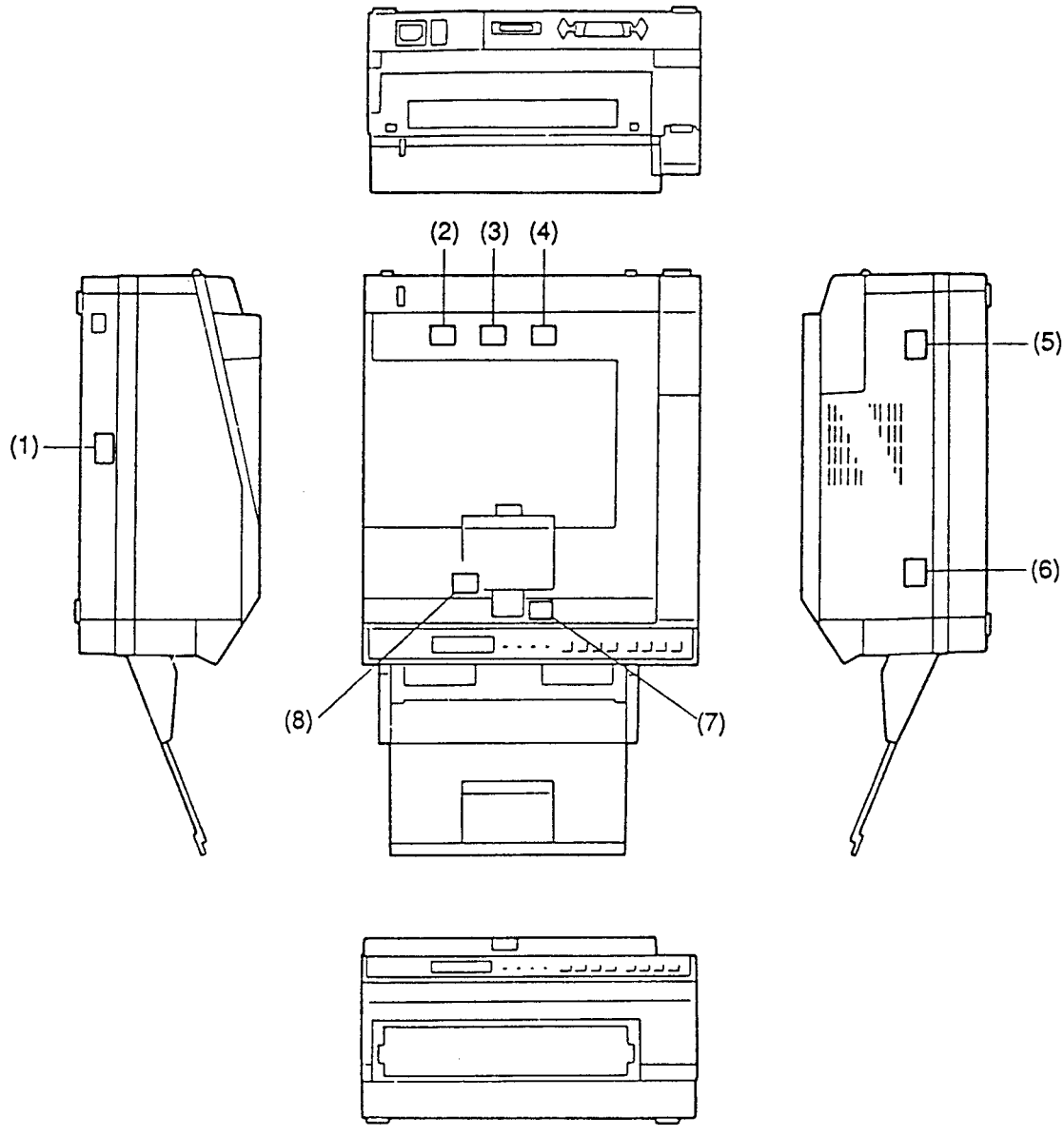


Fig. 4-3

(1) Cover open sensor
(2) Thermostat
(3) Temperature fuse
(4) Thermistor
(5) Feed sensor 2
(6) Feed sensor 1
(7) Paper empty sensor
(8) Toner empty sensor

3. List and Layout Diagram of PC Board and Connectors

3.1 Mechanical controller PC board

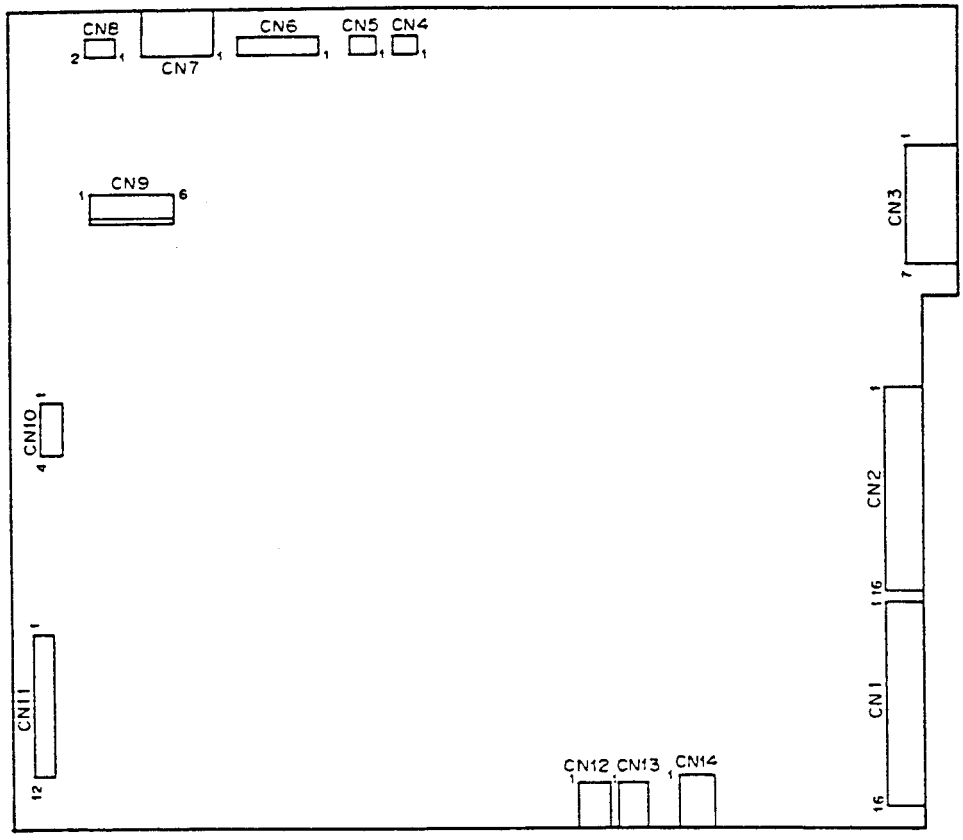


Fig. 4-4

3.2 Operation panel PC board

Fig. 4-5

3.3 Main power supply PC board

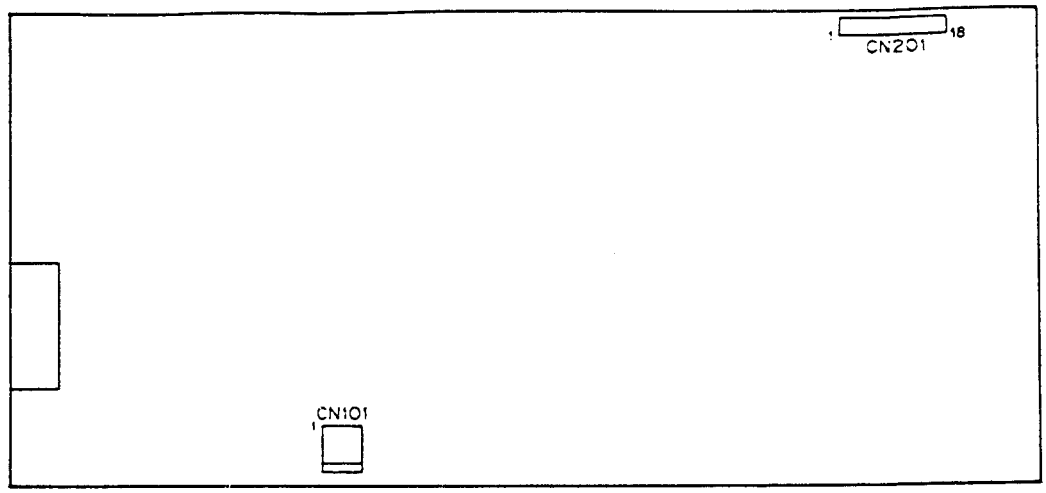


Fig. 4-6

3.4 High voltage power supply PC board

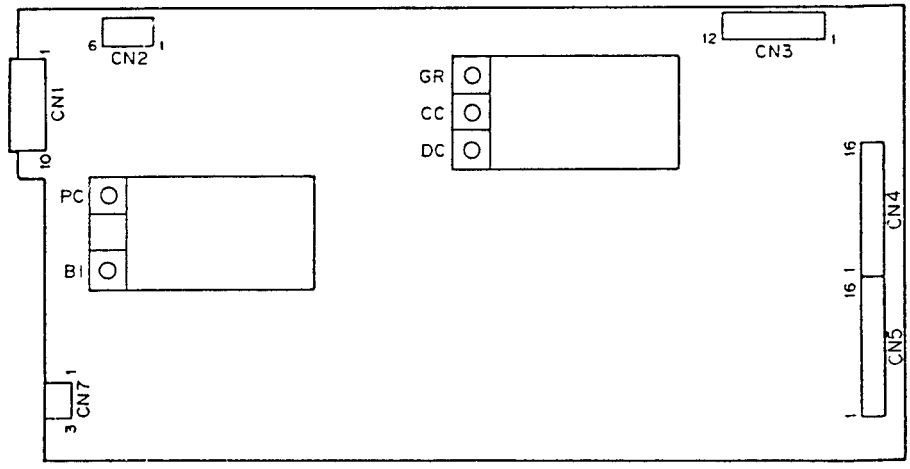


Fig. 4-7

3.5 Main controller PC board

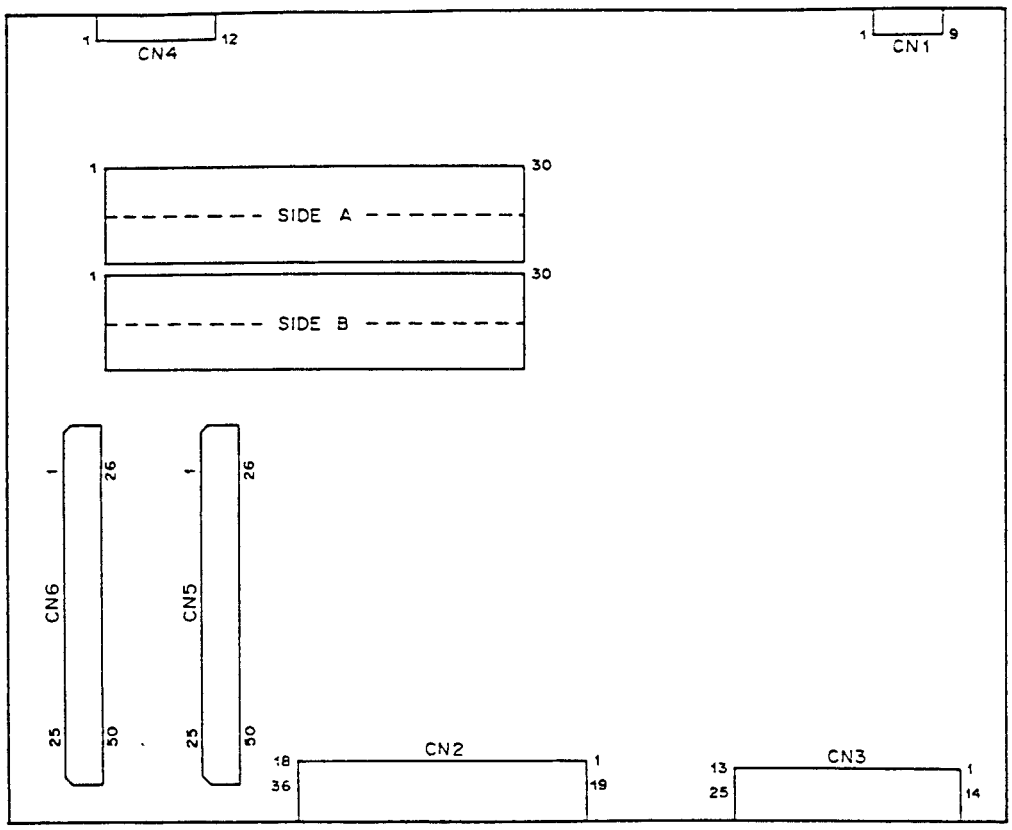


Fig. 4-8

4. Laser Scanner Section

4.1 Outline

This printer employs a semiconductor laser with a photo-sensitive drum acting as the exposure light source. The semiconductor laser is built into the laser unit and generates a fine high luminance laser beam. The laser beam, which is demodulated by the laser drive (LD) signal from the mechanical controller PC board, enters a polygon mirror. The laser beam reflected by the polygon mirror is applied to the drum reflect the reflecting mirror.
The sensor is used to detect each line starting position for the laser beam from the polygon mirror. The horizontal print position is determined according to the signal from the sensor.

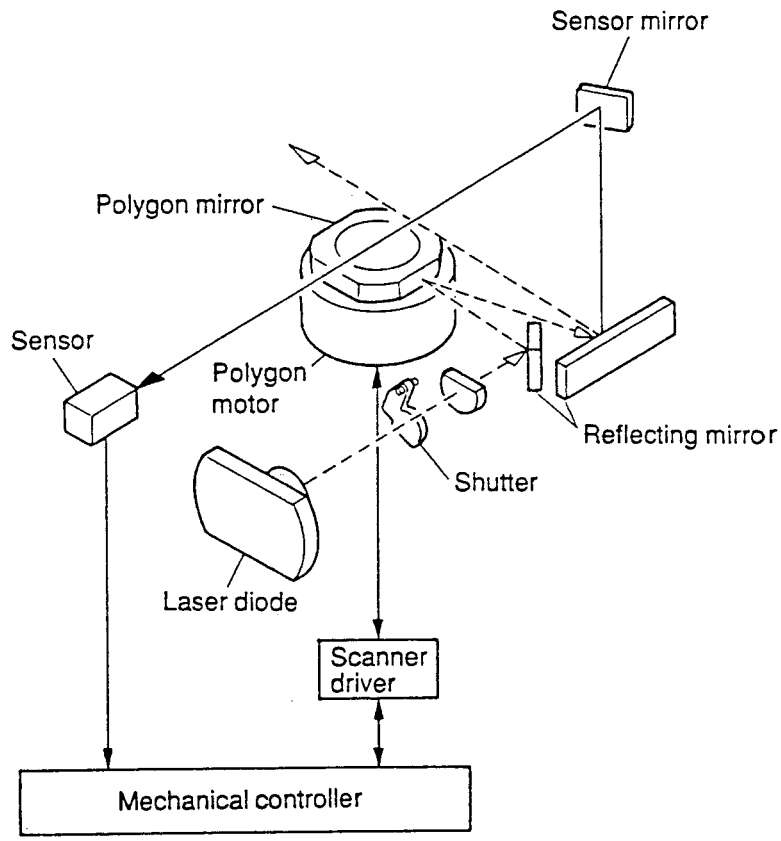


Fig. 4-9

4.2 Semiconductor laser

(1) Principle of light emission

When voltage is applied to metal, electrons having a negative charge are transferred into the metal so that a current flows through it.

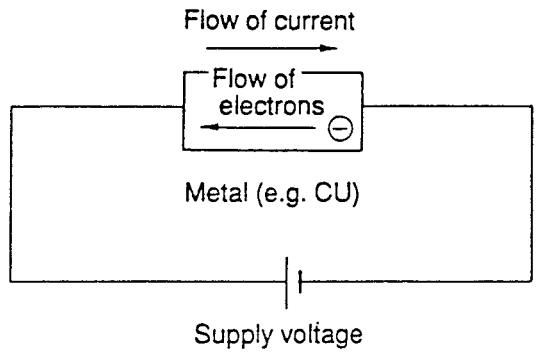


Fig. 4-10

With a semiconductor, the electrons and positive holes are transferred into the semiconductor so that a current flows.
The positive holes, with their positive load, may be regarded as the "skin" that is cast off after the transfer of electrons into the semiconductor.

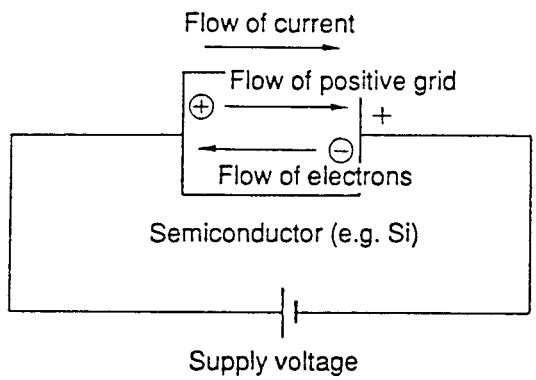


Fig. 4-11

Regarding the flow of current, a semiconductor with its main part of current flow by electron injection is called on N-type semiconductor, whereas a semiconductor with its main part of current flow by positive hole injection is called a P-type semiconductor. The semiconductor laser is a type of diode with a structure that combines the N-type and P-type semiconductor.

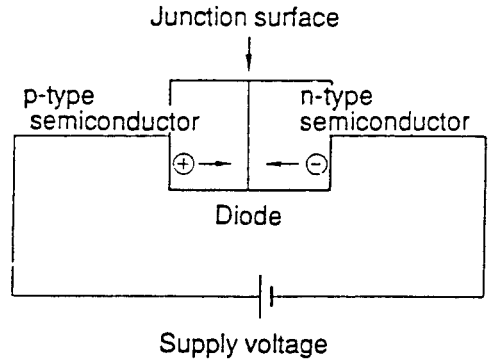


Fig. 4-12

As shown in Fig. 4-12, when a forward voltage is applied to this diode, the holes flow to the right and the electrons flow to the left. Then, a current flows when the holes and electrons combine at the junction surfaces. As shown in Fig. 4-13, the junction surfaces of the semiconductor laser are of a certain width, and both sides (the shaded areas) form reflecting surfaces.
(These two reflecting surfaces will be hereafter referred to as the "junction area".)

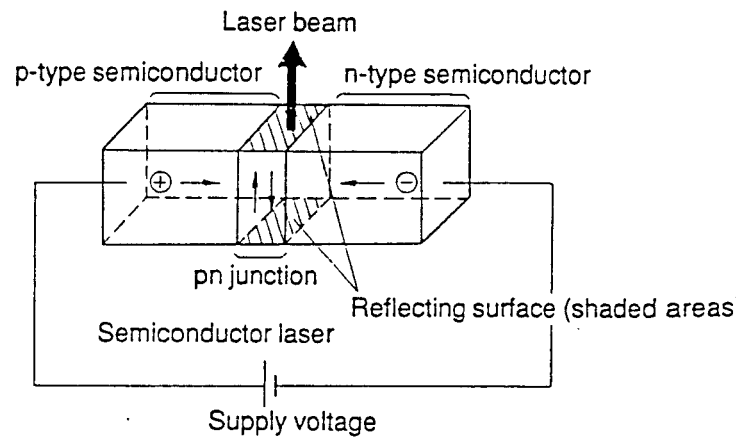


Fig. 4-13

When a forward voltage is applied to this semiconductor laser, the holes and electrons combine at the junction area as in the case of the diode, and the energy discharged upon the joining of the holes and electrons is discharged as light. The discharged light is enclosed in the junction area, and is reflected by the reflecting surfaces of both sides, moving reciprocally within the junction area.
Due to the consecutive joining of holes and electrons during the reciprocal movement, the right is correspondingly amplified.
Then, when the light has become infinitely amplified, the semiconductor laser emits a laser beam from the reflecting surfaces.
This laser beam is an invisible ultraviolet radiation, but it is a good monochromatic radiation with high luminance at a large-volume output.
Consequently, the laser beam can be condensed by a lens to an extremely small focal point with high illuminance, thereby permitting its use in a laser printer.

(2) Laser drive

The mechanical controller PC board received video data from the main controller.
The mechanical controller formes the laser drive signal on the bases of the video signals.
The laser drive signal, which is a current signal, controls the current flowing through the semiconductor laser element.
The semiconductor laser element generates a laser beam when a current equal to or greater than the stipulated value (I th) is flowing.

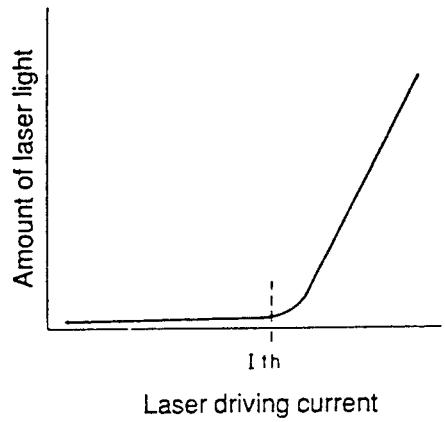


Fig. 4-14

(3) Laser diode unit

The laser unit consists of the semiconductor laser element and an objective lens.

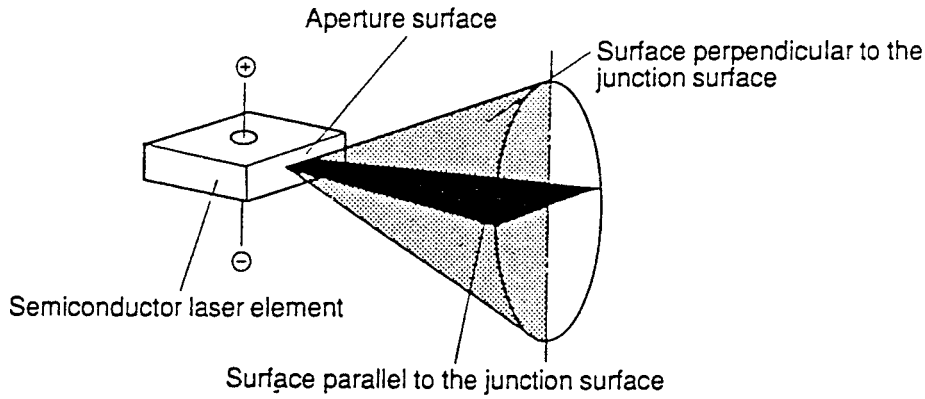

Aperture surface
Surface perpendicular to the junction surface
Semiconductor laser element
Surface parallel to the junction surface

Fig. 4-15

As shown in Fig. 4-15, the laser beam generated from the semiconductor laser is diffused light.
In this form therefore, it can not be used as the light source for exposing the photosensitive drum.
By placing an objective lens in front of the aperture surface of the semiconductor laser, as shown in Fig. 4-16, the laser beam from the semiconductor laser element is this converted into parallel light.

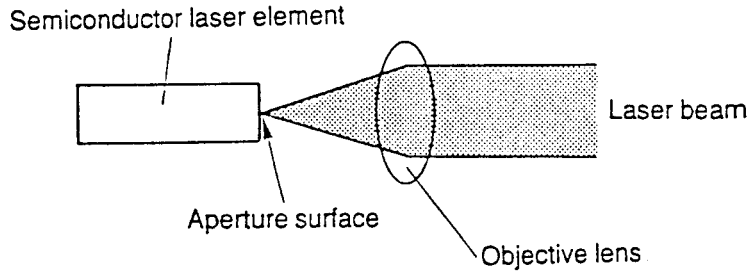


Fig. 4-16

The laser beam from the laser unit is entered to the polygon mirror. The polygon mirror has four surfaces and mounted onto the rotating shaft of the polygon motor.
When a scanner motor instruction signal (POD signal) is sent from the mechanical controller to the polygon driver, the polygon driver starts up the polygon motor.
And at the same time, controls the rotation of that motor to be at a constant speed.

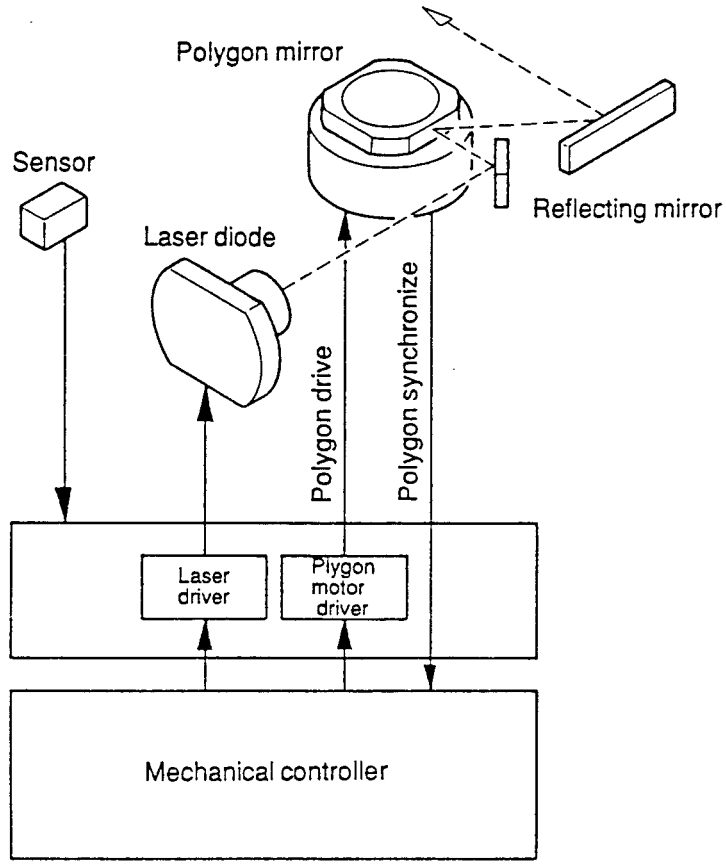


Fig. 4-17

The laser beam reflected by the rotation of the polygon mirror to form a focal point on the drum surface.
At the same time, the laser beam at the drum surface is scanned at a constant speed by the polygon mirror.
This printer generates character and images through the use of raster scanning.
For example, the character "A" is printed by scanning of a circularly polarized beam, as shown in Fig. 4-18.

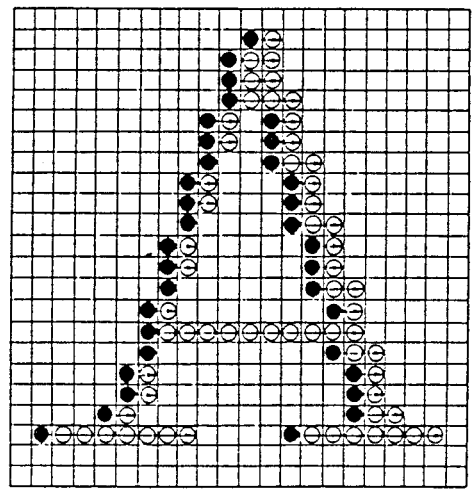


Fig. 4-18

5. Sensors and there functions

The equipment used are sensors, the signals from these sensors being used by the mechanical controller to control the execution of the print sequence and the operation of the various electronic components.

5.1 Feed sensors

There are two feed sensor, feed sensor 1 and feed sensor 2, each of which are used to detect the presence of paper in the transport area.

If either sensor detects the presence of paper when the power is turned ON, or after the top cover has closed, the mechanical controller judges this to be paper jam.

(1) Feed sensor 1

If feed sensor 1 is not turned ON a fixed time after received the print start command from the main controller, the mechanical controller is judged to have paper insertion error. If this error occurs during continuous printing, the operation is suspended after the previous page has been printed.
The heater is also turned OFF.
Feed sensor 1 errors are cancelled by removing the jammed paper and closing the top cover.
This time the heater is turned ON again, but the printer will remain in the off-line state.

(2) Feed sensor (2)

Feed sensor 2 checks the paper feed based on the moment at which feed sensor 1 is turned on. If feed sensor 2 is not turned OFF within a fixed time, the mechanical controller judges that a jam has occurred. The motor and heater are turned off.

Feed sensor 1 errors and feed sensor 2 errors are cancelled by removing the jammed paper and closing the top cover.

5.2 Cover open sensor

This sensor is used to detect if the top cover is open.
If it is open, the 24V power is cut, and the motors and heater are turned off.

This error is cancelled by closing the top cover again.

5.3 Paper empty sensor

This sensor is used to detect presence of paper in the paper cassette. If there is no paper in the paper cassette, paper empty error occurs.
If paper runs out during printing, the paper empty state starts after the last page has exited.
This error is cancelled by loading paper into the paper cassette.

5.4 Toner empty sensor

This sensor is used to detect presence of toner in the developer unit. If there is running low toner in the developer unit, toner empty error occurs.
Up to 5 pages can be printed after the toner empty error occurs. This sensor is also used to indicate the presence of a developer unit.

6. Print Sequence

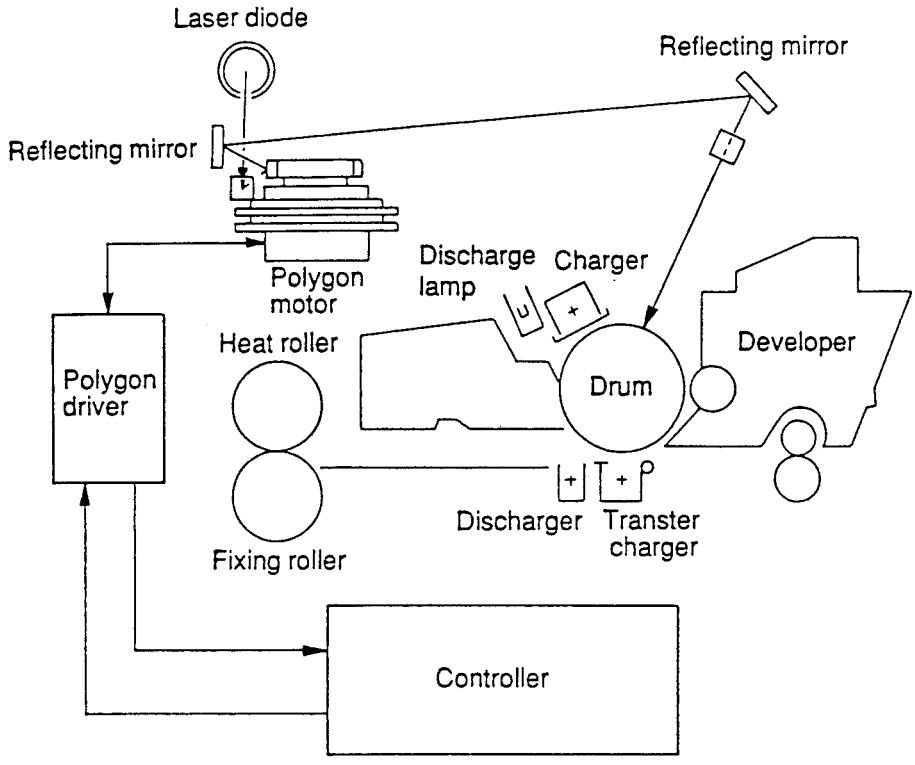


Fig. 4-19 Print sequence

6.1 POWER ON

6.2 Initialization

Matching of signal levels, RAM check and others.

6.3 Error check

Checks memory errors.
If detected, the ERROR light is turned ON.
Proceeds after the error has been cancelled.

6.4 Main motor ON

The main motor is switched ON for 6.5 seconds to check for paper in the transport system.

6.5 Start of WAIT state

(1) Heater ON

Fixing unit heater turned ON.
A thermistor check is made 15 seconds after the heater has been turned ON.

Also, if the heat rollers do not achieve the specified temperature within 90 seconds.

Operation resumes from 6-1 POWER ON after the error has been cancelled.
The sequence of operations conducted from 6-1 POWER ON to 6-5 Start of WAIT state constitute a warm-up period, which normally ends within 60 seconds.

6.6 Start ready

When the printer enters the stand-by status, the start ready bit of basic status changes to "1" to request a Basic Status Request Command from the host.

Operation proceeds to the following when a start command is received.

6.7 Pre-rotation

When a start command is sent from the host, the following preparations for printing are started:

- Main, polygon and magnetic motors start.
- Heater temperature is increased (to about 170~180°C from the stand-by temperature of about 155~165°C).
- The level of the $\overline{\text{CFON2}}$ signal is changed to HIGH and paper is fed from the cassette.
- The discharge lamp is turned ON.

6.8 Printing

When the paper is fed from the cassette as a result of the $\overline{\text{CFON2}}$ signal, printing commences as follows:

- The $\overline{\text{CCCLK1}}$ signal level changes to HIGH and the electrostatic charger and discharger are turned ON.
- The $\overline{\text{BICLK1}}$ signal level is changed to HIGH and the BIAS voltage is turned ON.
- The presence of paper at paper feeding is checked by feed sensor 1. If a jam has occurred, the heater is turned OFF, and each motor stops operating. Operation resumes from 7-3 Error Check after the jammed paper has been removed.

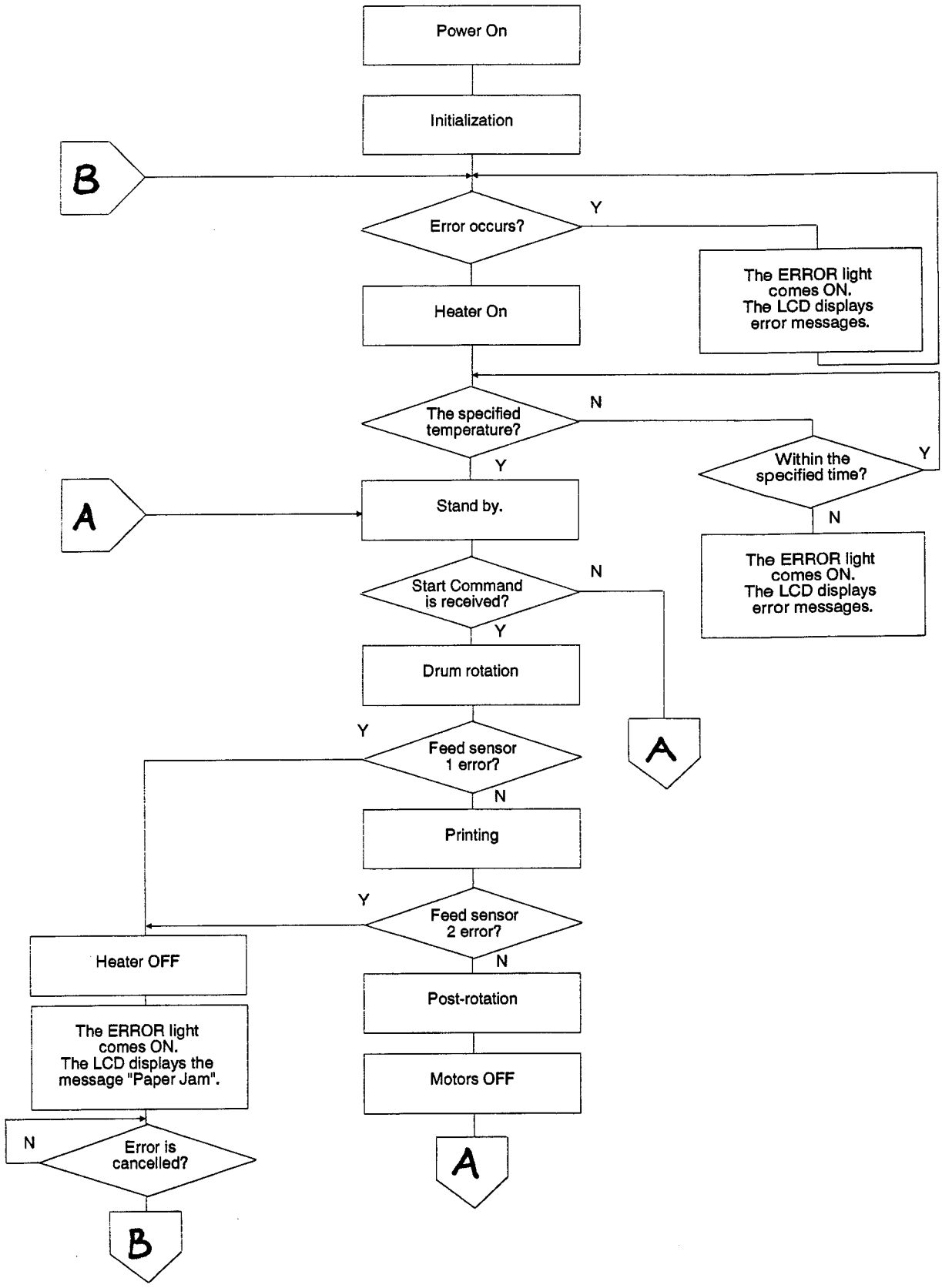
- $\overline{\text{PCLK}}$ and $\overline{\text{LSYNC}}$ signals are sent to the host.
- A $\overline{\text{VDA}}$ signal is sent from the host and an LD signal created to control the laser beam.
- The $\overline{\text{PCCLK1}}$ signal level is switched to LOW to turn ON the transfer charger.
- The presence of paper at the paper exit position is checked by feed sensor 2.

If a jam has occurred, the heater is turned OFF, and the motors stop operation.
Operation resumes from 6-3 Error checks after the jammed paper has been removed.

6.9 Post-rotation

After printing, the drum continues to rotate until the paper has fully exited.
This sequence of operations completes the printing of a single page. If printing a second and subsequent pages, the sequence is repeated from 6-6 Start ready.

7. Printing sequence Flowchart



NMS1474
CHAPTER:5- MECHANICAL DESCRIPTION

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1. Description of Feed Section Mechanism

The feed section mechanism is driven by the main motor and the developer motor. Power from these motors is transmitted to the respective parts through their gears and belts.

1.1 Cassette feed roller

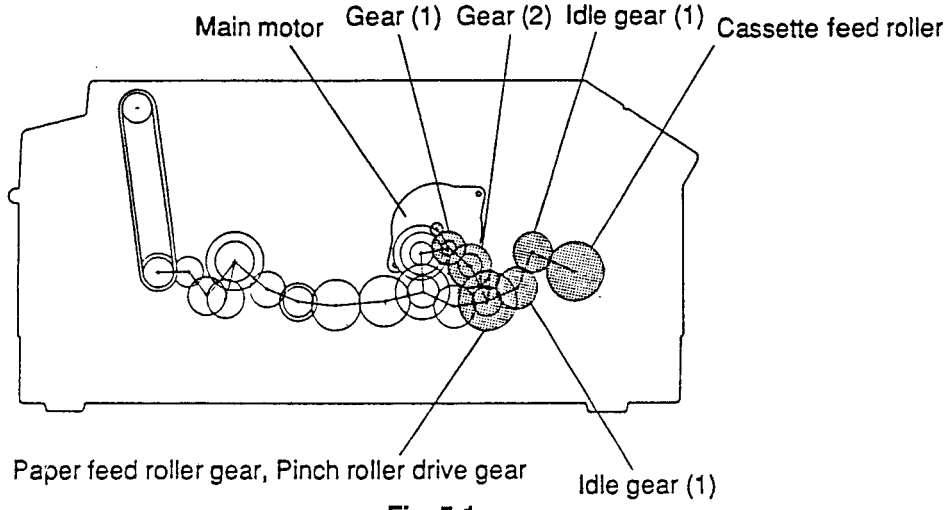


Fig. 5-1

1.2 Paper feed roller

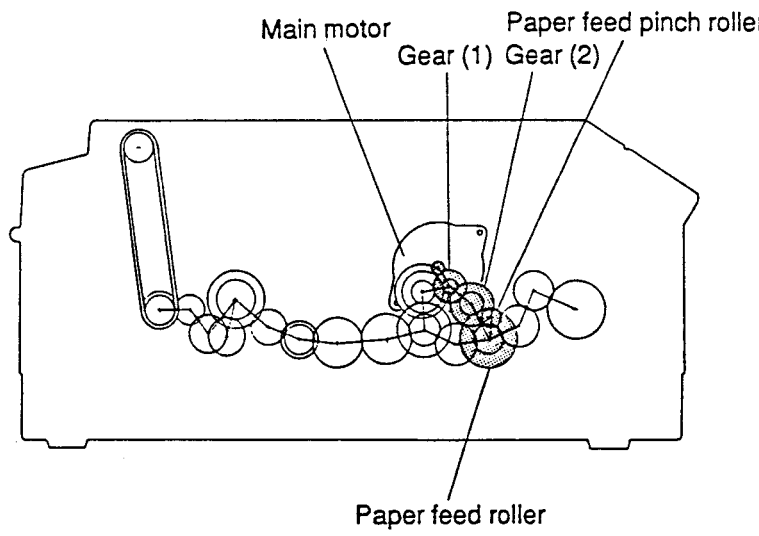


Fig. 5-2

1.3 Drum unit

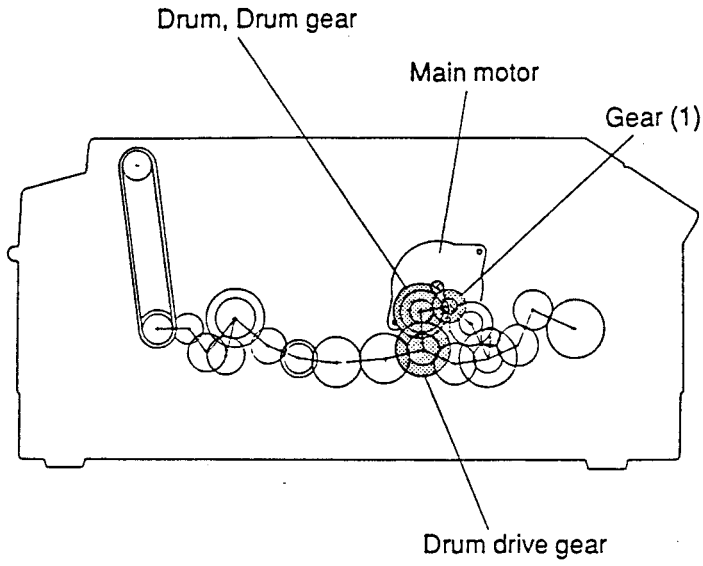


Fig. 5-3

1.4 Heat roller

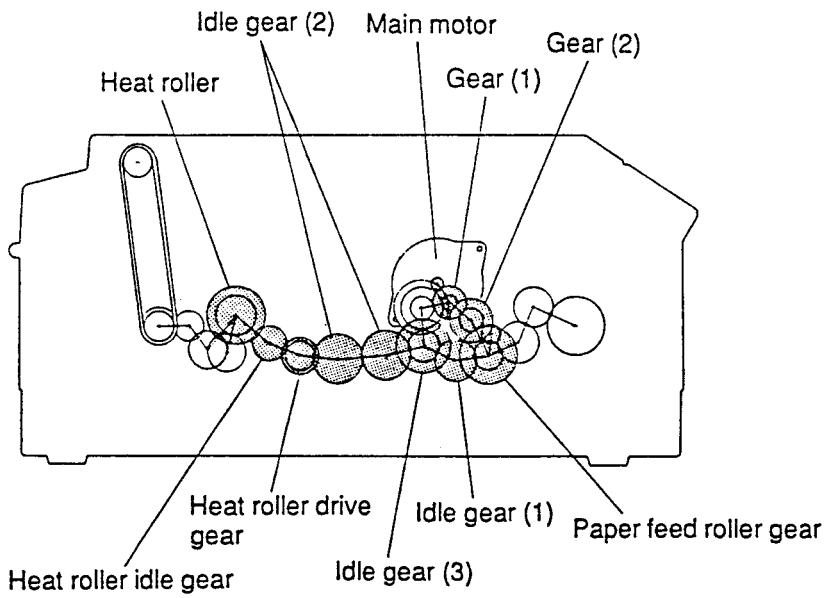


Fig. 5-4

1.5 Exit roller

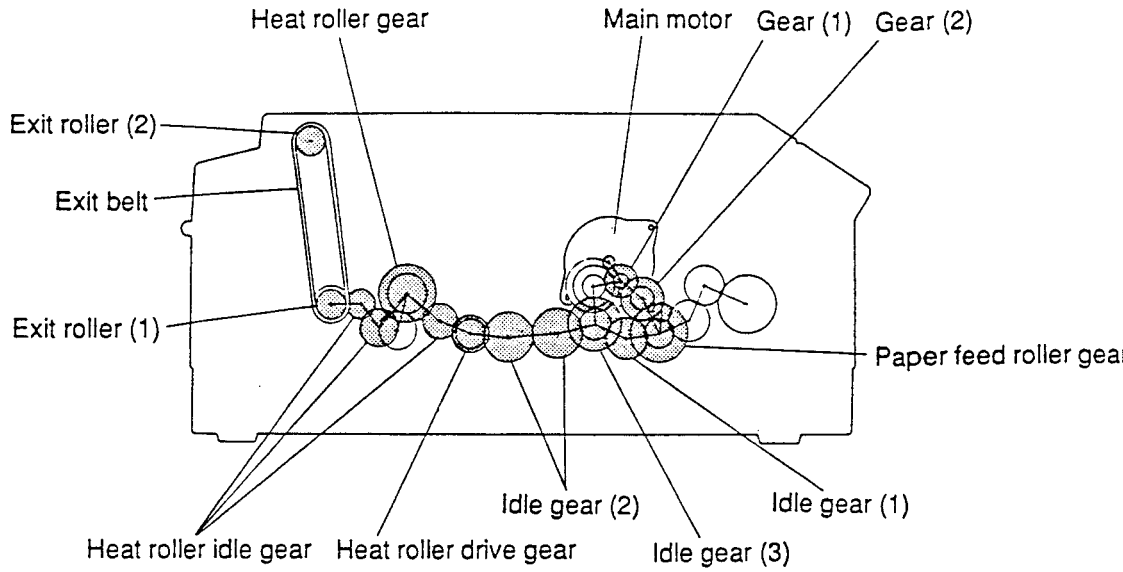


Fig. 5-5

1.6 Magnet roller and rummage roller

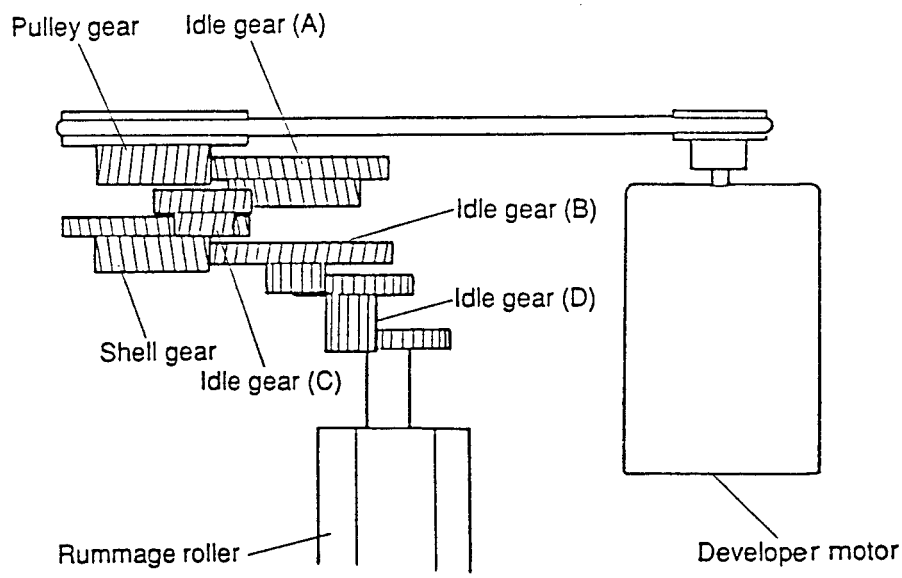


Fig. 5-6

2. Description of the operation of various Sensors

2.1 Paper empty sensor

This sensor is located on the front frame. The sensor detects whether or not paper is placed in the paper cassette by lifting of the sensor arm when paper is in the paper cassette.

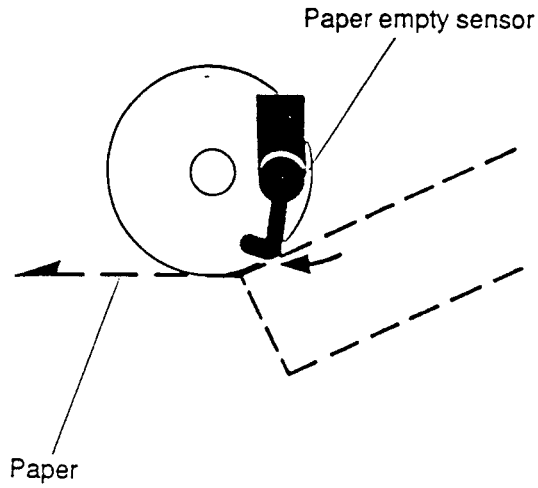


Fig. 5-7

2.2 Toner empty sensor

This sensor is located inside the developer unit. The sensor detects insufficient toner by means of the voltage element inside the sensor.

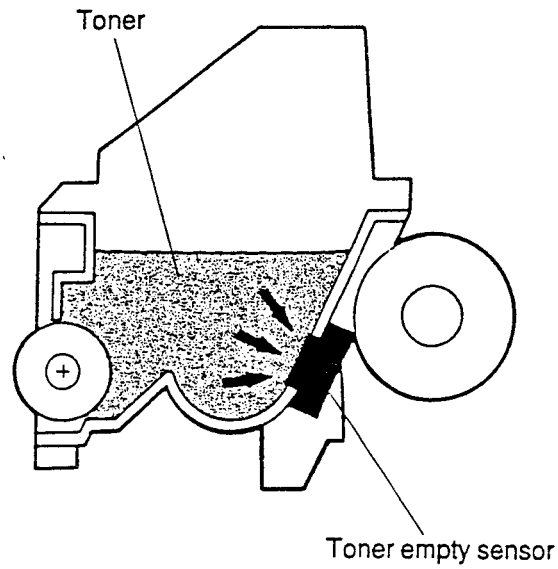


Fig. 5-8

When there is toner in the developer unit, the oscillation of the voltage element is dampened by the pressure of the toner and the presence of sufficient toner is thereby detected.

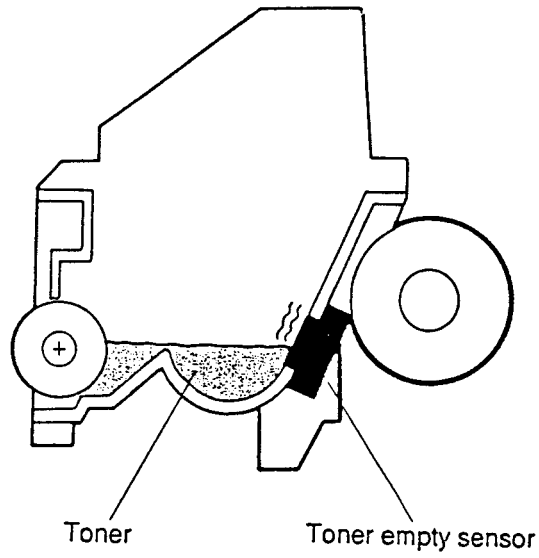


Fig. 5-9

2.3 Cover open sensor

This sensor is located on the main power supply. The cover open latch on the hold plate pushes the sensor arm which then turns on and off the sensor switch.

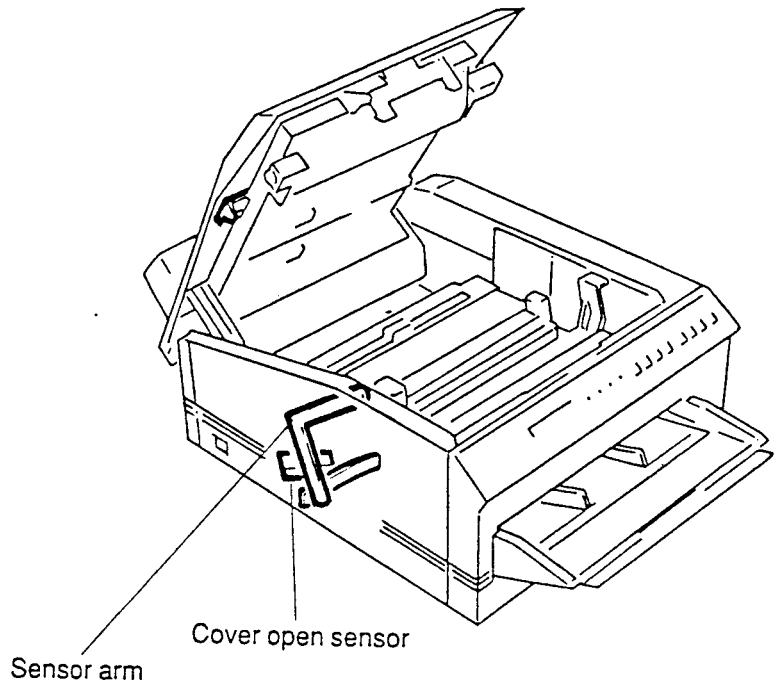


Fig. 5-10

2.4 Feed sensors

These sensors are attached to the areas for insertion and ejection of paper and detect paper jams.

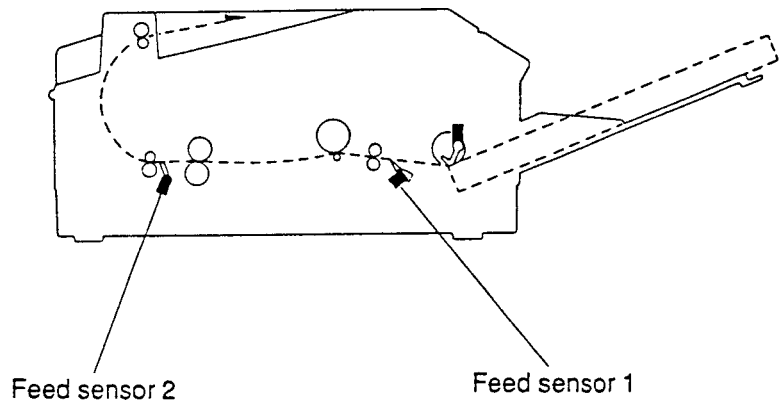


Fig. 5-11

For each sensor, the sensor arm is thrown by the paper and the sensor is set to the ON status and thereby detects that paper is in the feed part.

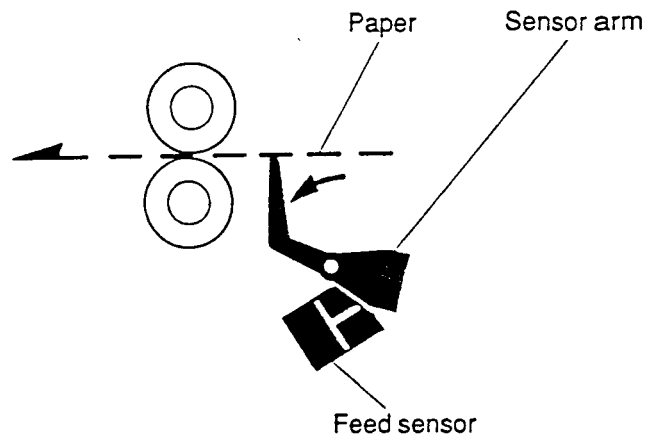


Fig. 5-12

When the paper is over the sensor, if any one of the sensors is set to ON, the mechanical controller detects a paper jam. The mechanical controller measures the timing to feed sensor 2 ON/OFF after feed sensor 1 is set to ON and detects paper even when there is a delay in the timing.

3. Disassembly and Reassembly

3.1 Covers

3.1.1 Operation panel

CAUTION: Before disassembling or reassembling any part, be sure to turn the power OFF and disconnect the power cord. Disassembling or reassembling with the power ON may result in trouble such as getting a shock.

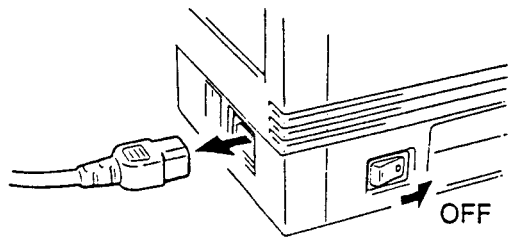


Fig. 5-13

WARNING:
- Be sure to use screwdrivers suitable for the respective screws. Otherwise the screws will be damaged.
- Replace parts and screws if damaged. Such parts may not only detract from the performance of the machine but also result in trouble.
- Remove the developer block, drum counter, and cleaning pad from the machine beforehand.
- Be sure to leave the removed drum (included in the developer block) and drum counter together.
- Note that exposing the drum surface directly to light will result in a drop in sensitivity of the drum (shorten its life). Wrap the removed drum unit with a soft cloth etc.

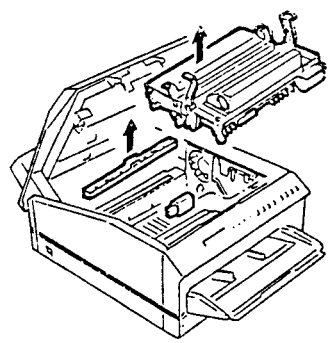


Fig. 5-14

Removal

(1) Open the top cover and remove the one set screw of the operation panel.
(2) Release the left and right hooks, detach the one connector from the connector (CN*) on the mechanical controller, and remove the operation panel.

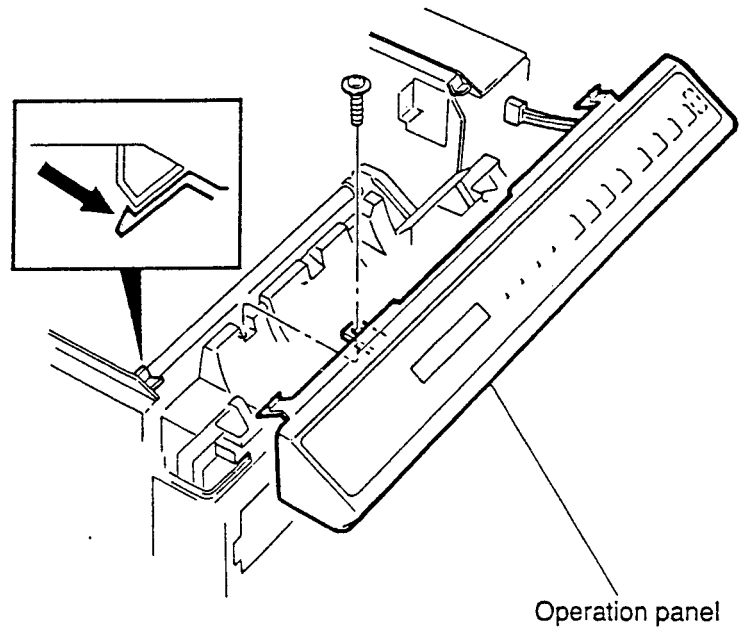


Fig. 5-15

Installation

(1) Attach the one connector from the operation panel to the mechanical controller.
(2) Align the guides (three places) of the operation panel with the slots in the front cover and set the left and right hooks in place.
At this time, the guides on the inner side of the operation panel must be placed on the inner side of the front cover and side cover on the left and right sides of the operation panel.

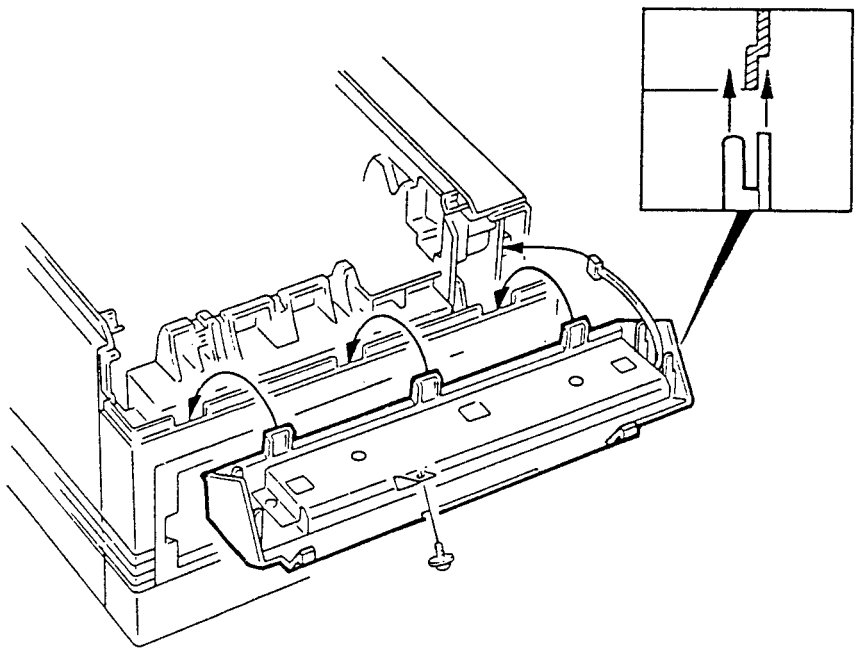


Fig. 5-16

(3) Secure the operation panel using the one set screw.

3.1.2 Top cover

CAUTION: Before disassembling or reassembling any part, be sure to turn the power OFF and disconnect the power cord. Disassembling or reassembling with the power ON may result in trouble such as getting a shock.

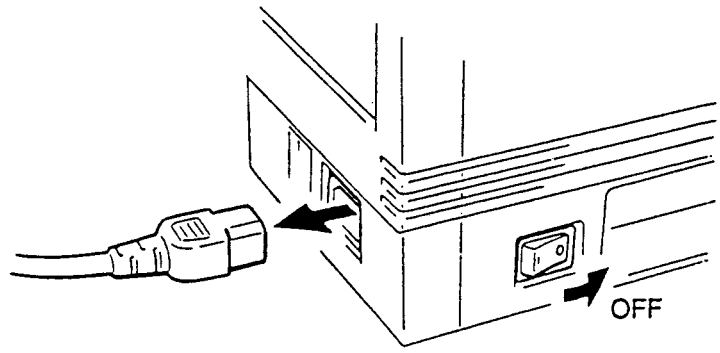


Fig. 5-17

WARNING:

- Remove the developer block, drum counter, and cleaning pad from the machine beforehand.
- Be sure to leave the removed drum (included in the developer block) and drum counter together.
- Note that exposing the drum surface directly to light will result in a drop in sensitivity of the drum (shorten its life). Wrap the removed drum unit with a soft cloth, etc.

Removal

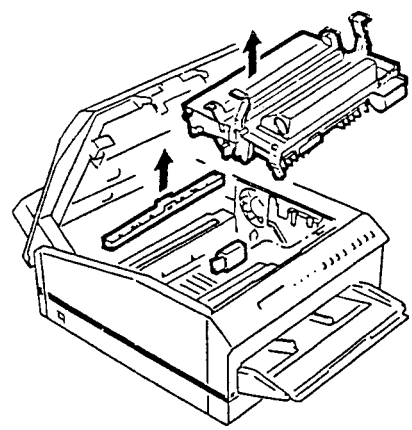


Fig. 5-18

(1) Remove the four set screws of the top cover and remove the top cover.

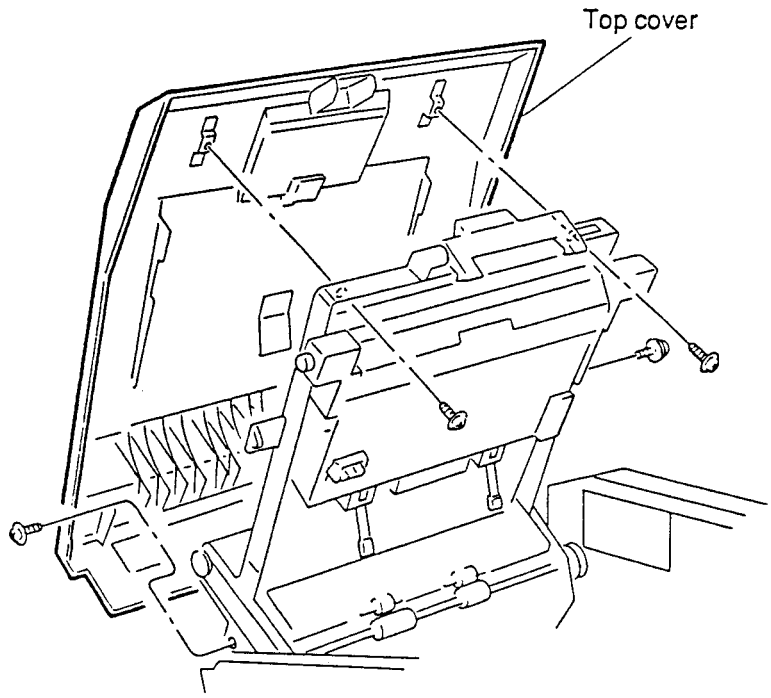


Fig. 5-19

Installation

(1) Set the top cover in position by aligning with the hold plate. Then secure the top cover with the four set screws.

3.1.3 Upper covers

CAUTION: Before disassembling or reassembling any part, be sure to turn the power OFF and disconnect the power cord. Disassembling or reassembling with the power ON may result in trouble such as getting a shock.

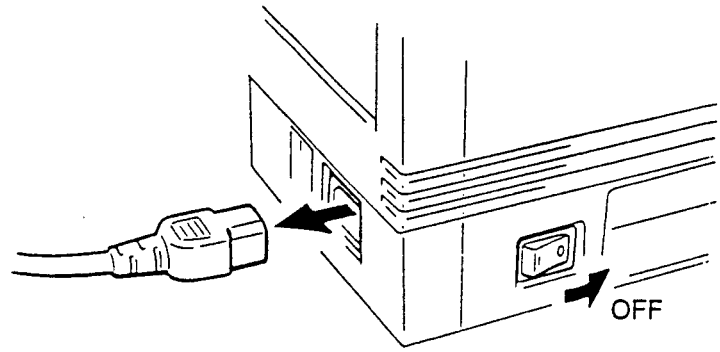


Fig. 5-20

WARNING:
- Be sure to use screwdrivers suitable for the respective screws. Otherwise the screws will be damaged.
- Replace parts and screws if damaged. Such parts may not only detract from the performance of the machine but also result in trouble.
- Remove the developer block, drum counter, and cleaning pad from the machine beforehand.
- Be sure to leave the removed drum (included in the developer block) and drum counter together.

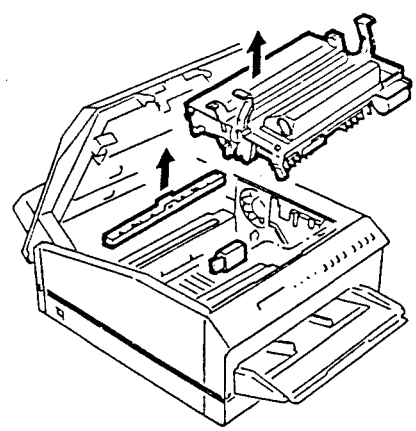


Fig. 5-21

- Note that exposing the drum surface directly to light will result in a drop in sensitivity of the drum (shorten its life). Wrap the removed drum unit with a soft cloth, etc.

Removal

The following four upper covers are mounted on this printer: front and rear and left and right.

WARNING: Each cover is hooked to the base block at three places. An attempt to remove the cover by force can break the hooks.

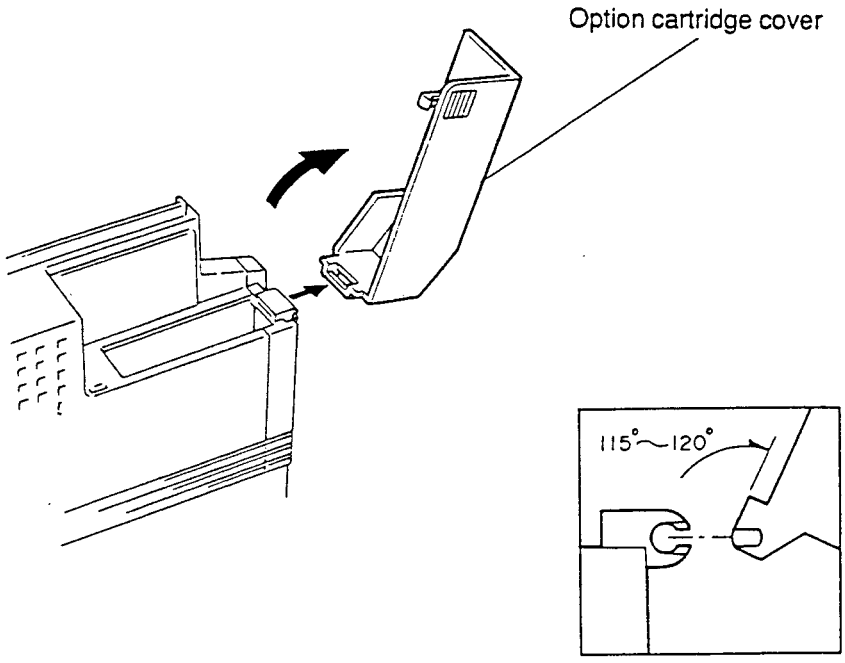


Fig. 5-22

(1) Remove the main controller. (Refer to 3.2.1, "Main controller.")
(2) Remove the operation panel. (Refer to 3.1.1, "Operation panel.")
(3) Remove the top cover. (Refer to 3.1.2, "Top cover.")
(4) Open the option cartridge cover at a 115 to 120° angle and remove the cover away from you.

(5) Remove the two set screws of the front cover and remove the front cover.

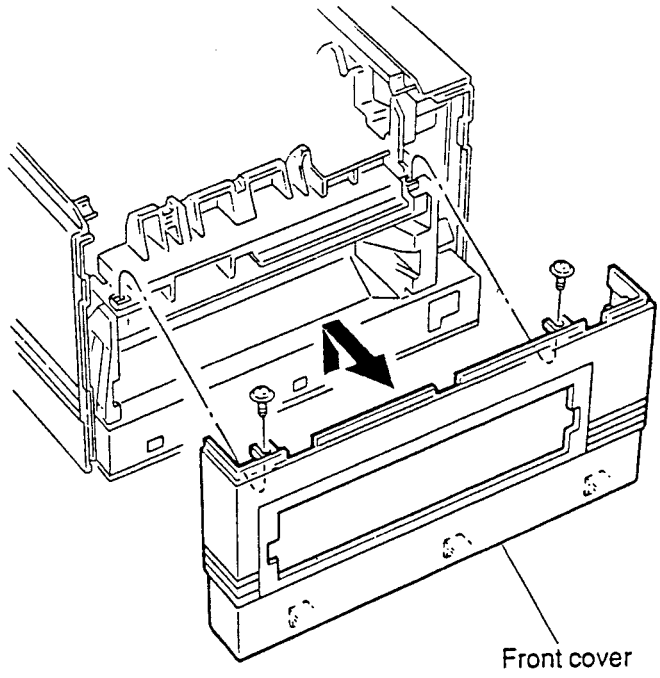


Fig. 5-23

(6) Remove the two set screws of the rear cover and remove the rear cover.
(7) Remove the left and right side covers.

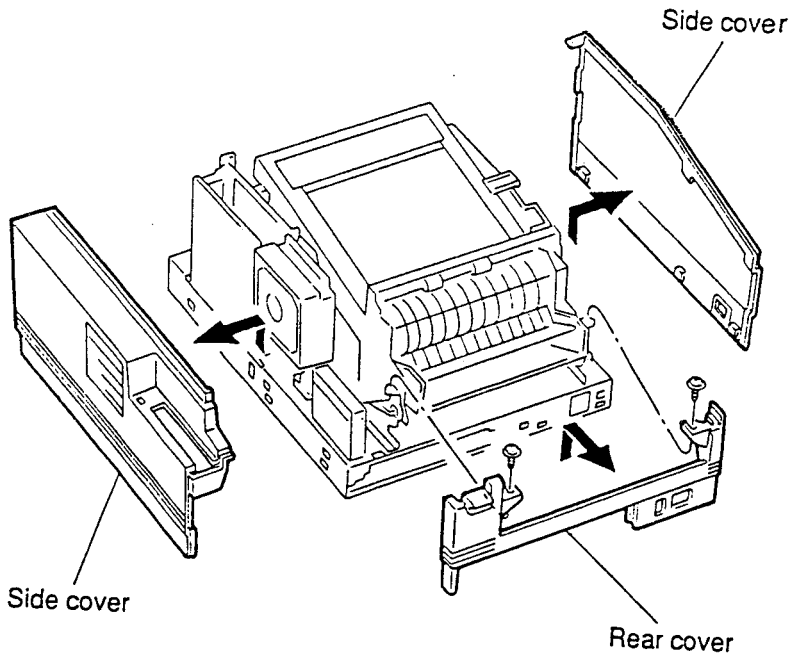


Fig. 5-24

Installation

WARNING: When reassembling, be careful not to trap the harness between parts.

(1) Put the hooks on the inner side of each of the left and right side covers into the holes in the base plate and lock into position. Then mount the side covers. The left side cover has a hook at the position indicated by the arrow and the hook must be caught by the side frame.

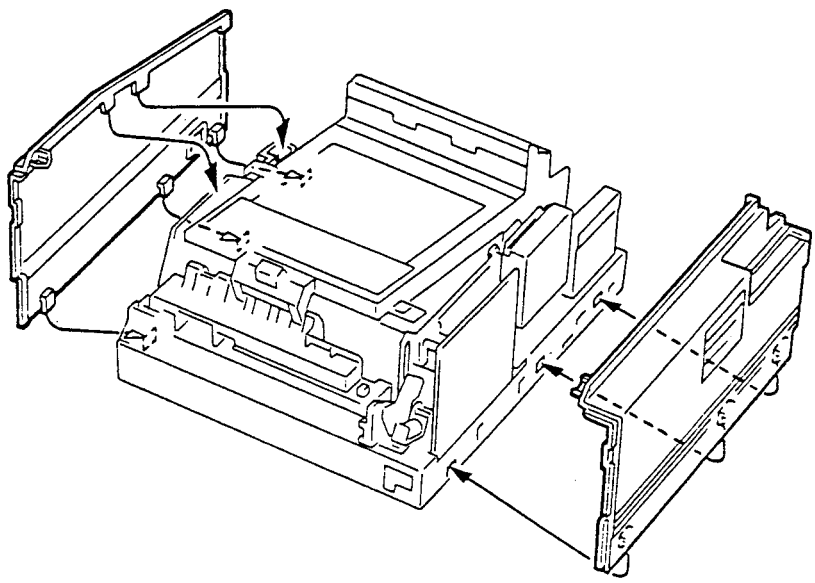


Fig. 5-25

(2) Put the hooks on the inner side of the rear cover into the holes in the base plate and lock into position. At this time, the side cover must be put between the guide parts on the left and right sides of the rear cover with aligning the boss position.

(3) Secure the rear cover using the two set screws.

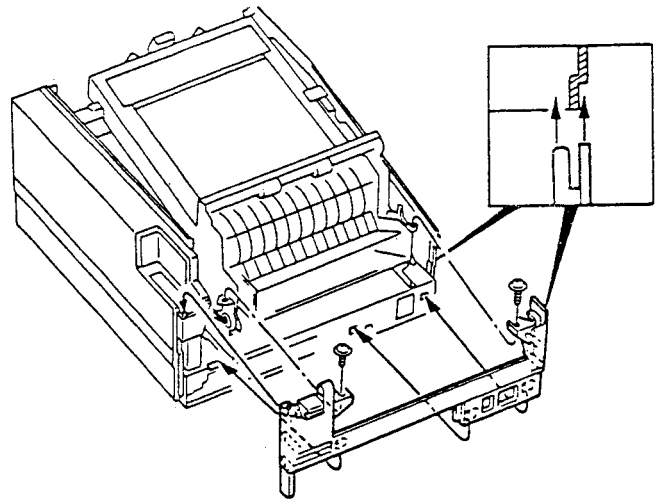


Fig. 5-26

(4) Put the hooks on the inner side of the front cover into the holes in the base plate and lock into position. At this time, the side cover must be put between the guide parts on the left and right sides of the front cover.
(5) Secure the front cover using the two set screws.

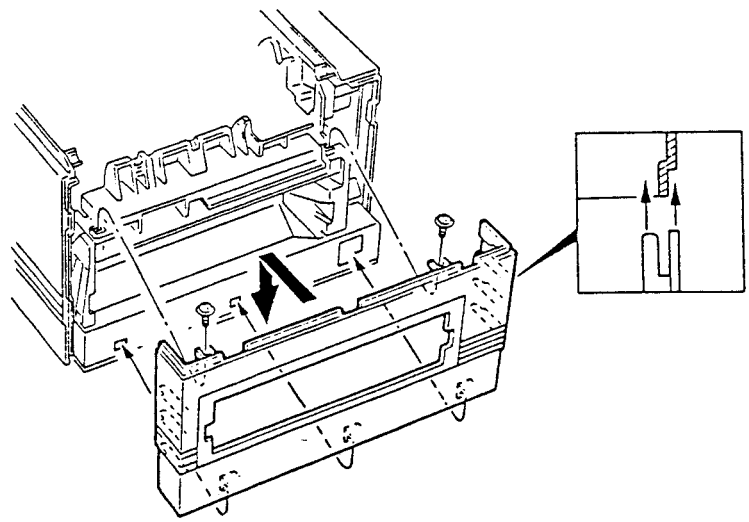


Fig. 5-27

(6) Mount the option cartridge cover.
(7) Mount the top cover. (Refer to 3.1.2, "Top cover.")
(8) Mount the operation panel. (Refer to 3.1.1, "Operation panel.")
(9) Mount the main controller. (Refer to 3.2.1, "Main controller.")

3.2 Controllers and Power supplies

3.2.1 Main controller

CAUTION: Before disassembling or reassembling any part, be sure to turn the power OFF and disconnect the power cord. Disassembling or reassembling with the power ON may result in trouble such as getting a shock.

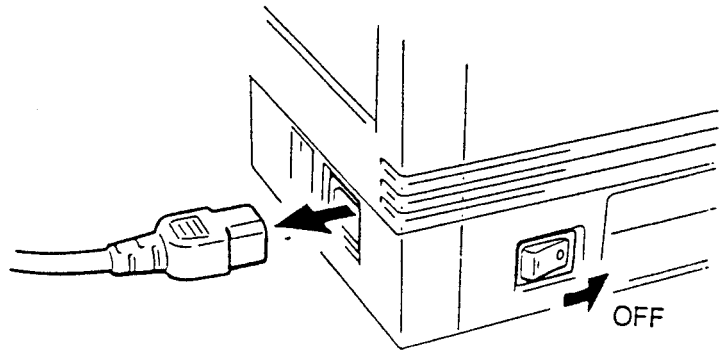


Fig. 5-28

WARNING:
- Be sure to use screwdrivers suitable for the respective screws. Otherwise the screws will be damaged.
- Replace parts and screws if damaged. Such parts may not only detract from the performance of the machine but also result in trouble.
- Remove the developer block, drum counter, and cleaning pad from the machine beforehand.
- Be sure to leave the removed drum (included in the developer block) and drum counter together.

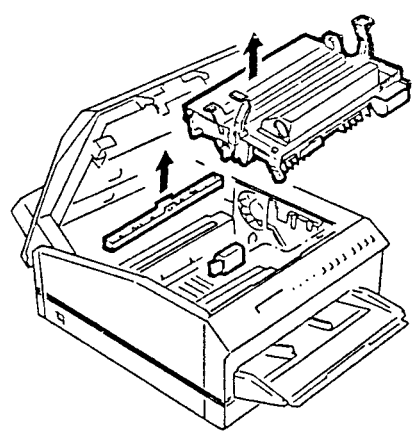


Fig. 5-29

- Note that exposing the drum surface directly to light will result in a drop in sensitivity of the drum (shorten its life). Wrap the removed drum unit with a soft cloth, etc.

Removal

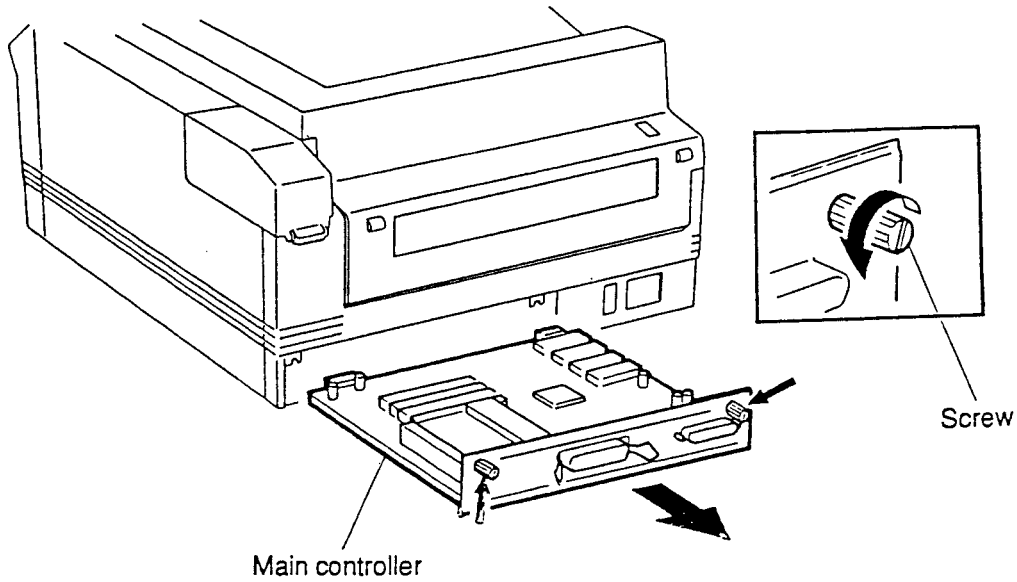


Fig. 5-30

(1) Loosen the set screws of the main controller and remove the main controller by drawing out.

Installation

(1) Insert the main controller along the guides of the main controller entrance.
(2) Secure the main controller using the two set screws.

3.2.2 Mechanical controller

CAUTION: Before disassembling or reassembling any part, be sure to turn the power OFF and disconnect the power cord. Disassembling or reassembling with the power ON may result in trouble such as getting a shock.

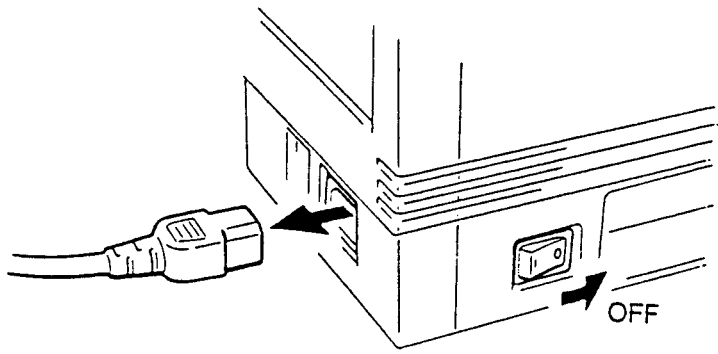


Fig. 5-31

WARNING:
- Be sure to use screwdrivers suitable for the respective screws. Otherwise the screws will be damaged.
- Replace parts and screws if damaged. Such parts may not only detract from the performance of the machine but also result in trouble.
- Remove the developer block, drum counter, and cleaning pad from the machine beforehand.
- Be sure to leave the removed drum (included in the developer block) and drum counter together.
- Note that exposing the drum surface directly to light will result in a drop in sensitivity of the drum (shorten its life). Wrap the removed drum unit with a soft cloth, etc.

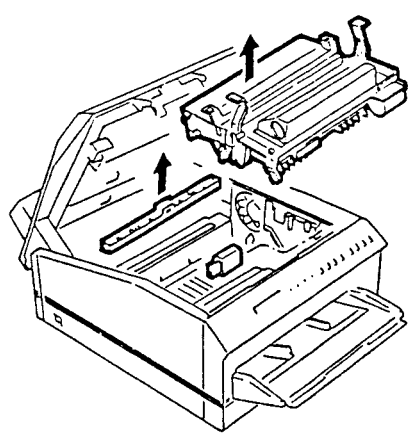


Fig. 5-32

Removal

(1) Remove the main controller. (Refer to 3.2.1, "Main controller.")
(2) Remove the operation panel. (Refer to 3.1.1, "Operation panel.")
(3) Remove the top cover. (Refer to 3.1.3, "Top cover.")
(4) Remove the upper covers. (Refer to 3.1.3, "Upper covers.")
(5) Detach the connectors (11 pcs.) from the mechanical controller.
(6) Remove the set screws (2 pcs.) securing the mechanical controller and the Mechanical controller shield plate.
(7) Remove the mechanical controller and Mechanical controller shield plate.

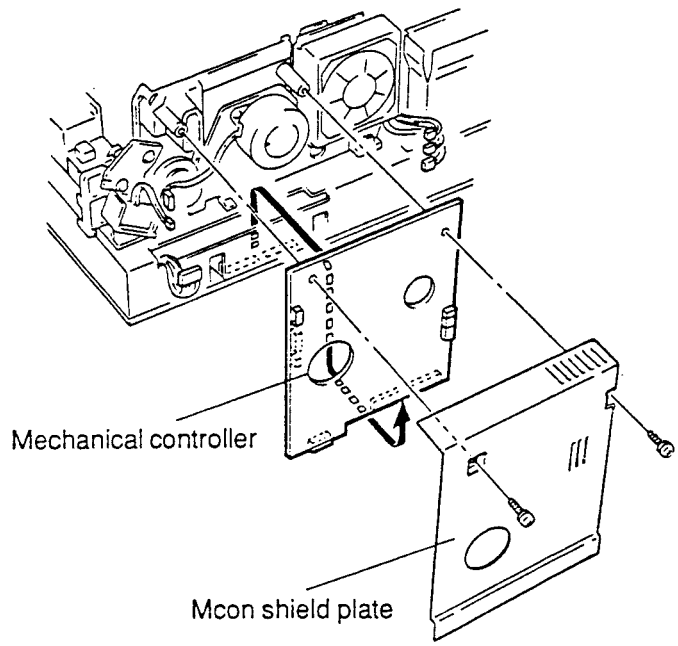


Fig. 5-33

Installation

(1) Tighten the set screws (4 pcs.) of the mechanical controller and Mechanical controller shield plate.
(2) Attach the total of 11 connectors of the heater unit, main motor, etc. to the mechanical controller.
(3) Mount the upper covers. (Refer to 3.1.3, "Upper covers.")
(4) Mount the top cover. (Refer to 3.1.2, "Top cover.")
(5) Mount the operation panel. (Refer to 3.1.1, "Operation panel.")
(6) Mount the main controller. (Refer to 3.2.1, "Main controller.")

Note: Perform adjustment of the heat roller temparature (refer to page 5-76, 4-2 Adjusting the heat roller temparature) and adjustment of the left margin, top of form (refer to page 5-80, 4-3 Adjusting the left margin and top of form) after replacing the mechanical controller.

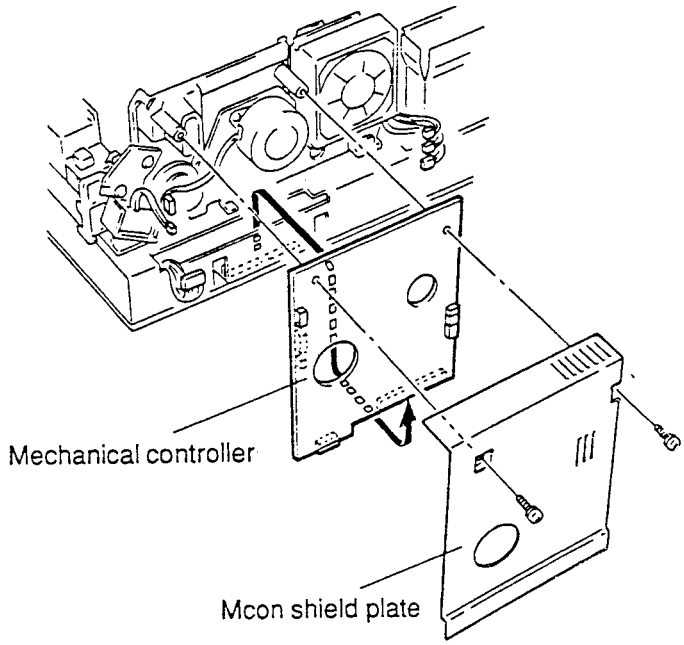


Fig. 5-34

3.2.3 Main Power supply

CAUTION: Before disassembling or reassembling any part, be sure to turn the power OFF and disconnect the power cord. Disassembling or reassembling with the power ON may result in trouble such as getting a shock.

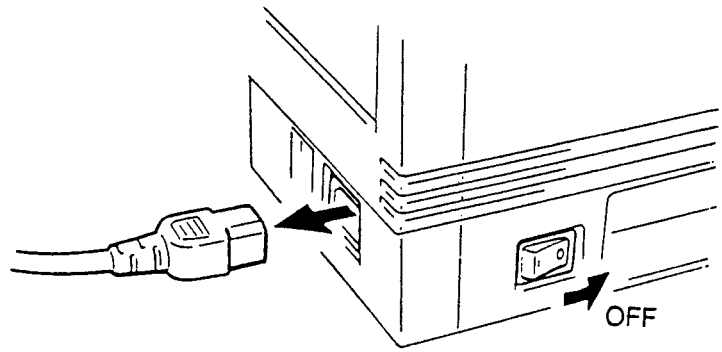


Fig. 5-35

WARNING:
- Be sure to use screwdrivers suitable for the respective screws. Otherwise the screws will be damaged.
- Replace parts and screws if damaged. Such parts may not only detract from the performance of the machine but also result in trouble.
- Remove the developer block, drum counter, and cleaning pad from the machine beforehand.
- Be sure to leave the removed drum (included in the developer block) and drum counter together.
- Note that exposing the drum surface directly to light will result in a drop in sensitivity of the drum (shorten its life). Wrap the removed drum unit with a soft cloth, etc.

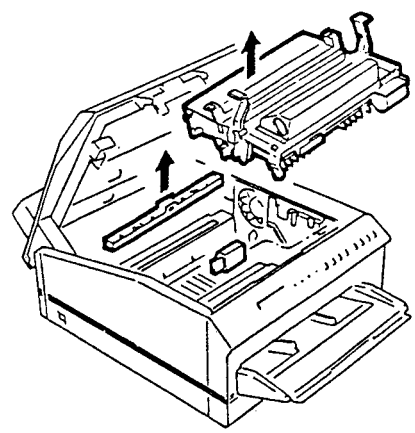


Fig. 5-36

Removal

WARNING: If you force to remove the main power supply, you may damage the connector to the high voltage power supply.

(1) Remove the main controller. (Refer to 3.2.1, "Main controller.")
(2) Remove the operation panel. (Refer to 3.1.1, "Operation Panel".)
(3) Remove the top cover. (Refer to 3.1.2, "Top cover.")
(4) Remove the upper covers. (Refer to 3.1.3, "Upper covers.")
(5) Stand the printer on its back side.
(6) Remove the eight set screws securing the bottom plate and remove the bottom plate.

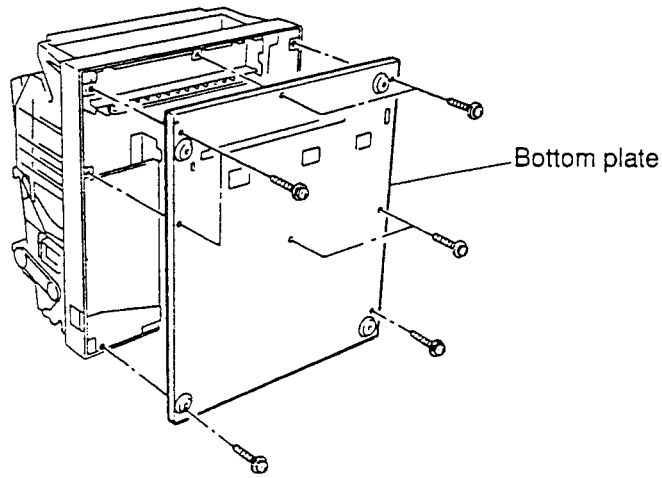


Fig. 5-37

(7) Remove the five set screws securing the main power supply.
(8) Take the main power supply out while disconnecting the connector to the high voltage power supply.
(9) Disconnect the one connector from the main power supply and remove the main power supply.

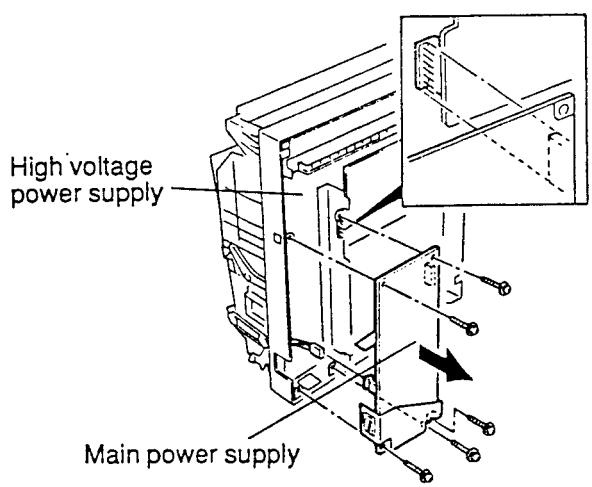


Fig. 5-38

Installation

WARNING: Make sure that the cover open switch position is correctly aligned with the switch arm position. If the position is not correct, the cover open switch will not function after the assembly. The connectors of the high voltage power supply and the main power supply may easily be displaced. Be very careful to connect these connectors correctly and firmly.

(1) Connect the one connector to the main power supply.
(2) Align the positions of the cover open switch and the switch arm, and install the main power supply with the connector attached to the high voltage power supply.

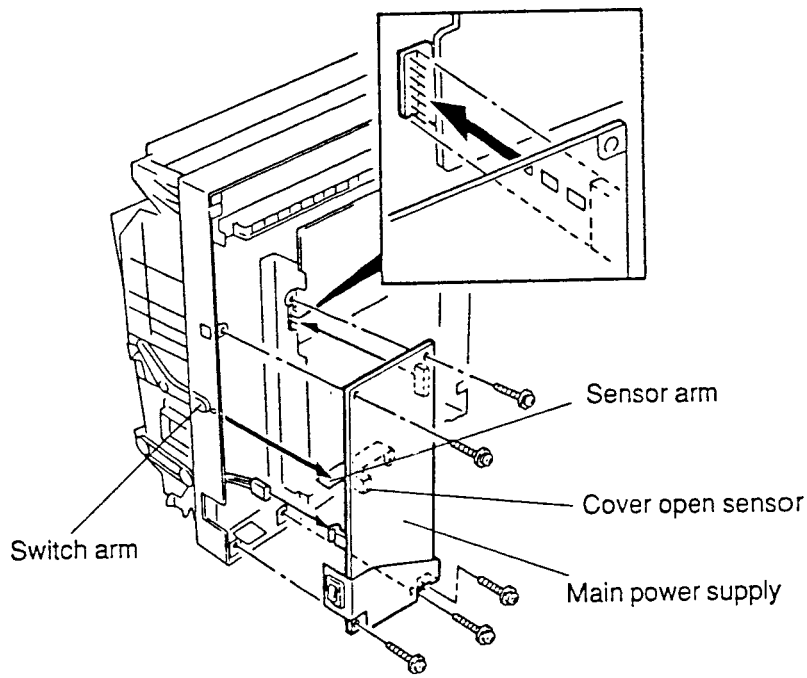


Fig. 5-39

(3) Secure the main power supply with the five set screws.
(4) Secure the bottom plate with the eight set screws.
(5) Put the printer back to its original position and insert the main controller. (Refer to 3.2.1, "Main controller.")
(6) Mount the upper covers. (Refer to 3.1.3, "Upper covers.")
(7) Mount the top cover. (Refer to 3.1.2, "Top cover.")
(8) Mount the operation panel. (Refer to 3.1.1, "Operation panel.")
(9) Mount the main controller. (Refer to 3.2.1, "Main controller.")

3.2.4 High voltage power supply

CAUTION: Before disassembling or reassembling any part, be sure to turn the power OFF and disconnect the power cord. Disassembling or reassembling with the power ON may result in trouble such as getting a shock.

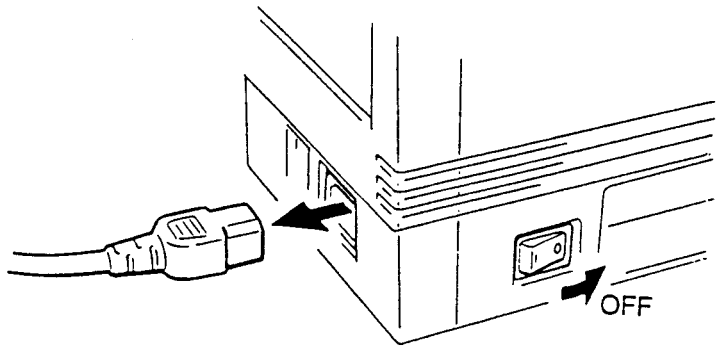


Fig. 5-40

WARNING:
- Be sure to use screwdrivers suitable for the respective screws. Otherwise the screws will be damaged.
- Replace parts and screws if damaged. Such parts may not only detract from the performance of the machine but also result in trouble.
- Remove the developer block, drum counter, and cleaning pad from the machine beforehand.
- Be sure to leave the removed drum (included in the developer block) and drum counter together.
- Note that exposing the drum surface directly to light will result in a drop in sensitivity of the drum (shorten its life). Wrap the removed drum unit with a soft cloth, etc.

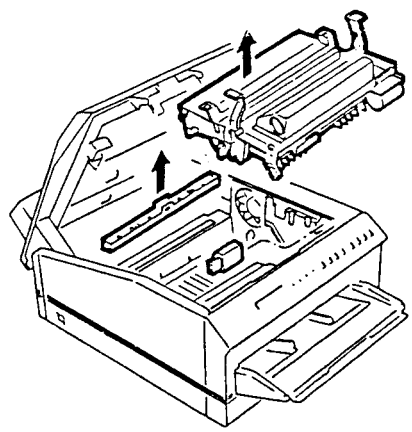


Fig. 5-41

Removal

(1) Remove the main controller. (Refer to 3.2.1, "Main controller.")
(2) Remove the operation panel. (Refer to 3.1.1, "Operation Panel".)
(3) Remove the top cover. (Refer to 3.1.2, "Top cover.")
(4) Remove the upper covers. (Refer to 3.1.3, "Upper covers.")
(5) Remove the main power supply. (Refer to 3.2.3, "Main power supply.")
(6) Remove the two guides for the controller.
(7) Remove the five set screws securing the high voltage power supply, detach the one connector coming from the feed sensor, and remove the high voltage power supply.

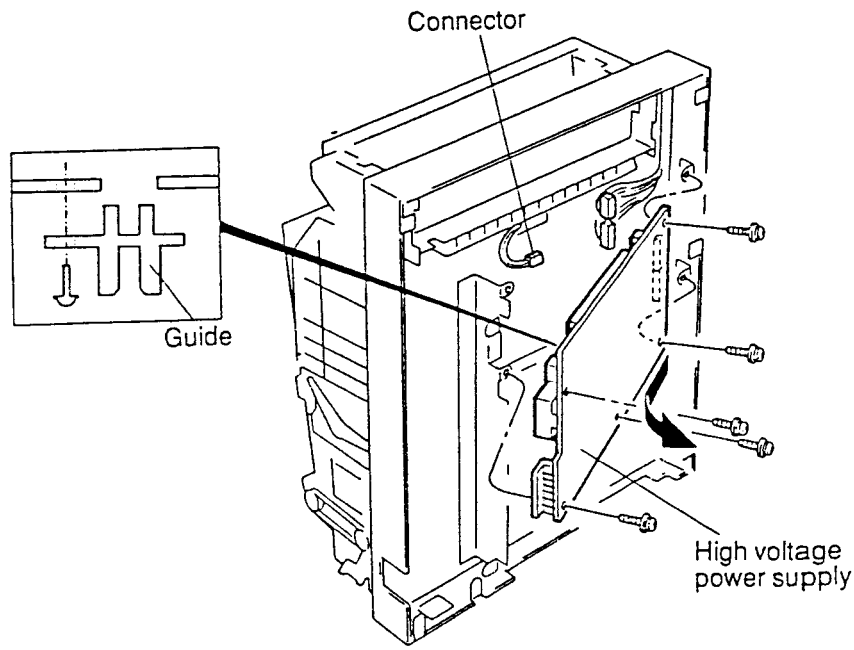


Fig. 5-42

Installation

(1) Attach the one connector coming from the feed sensor and secure the high voltage power supply using the five set screws.
(2) Mount the two guides for the controller.
(3) Mount the main power supply. (Refer to 3.2.3, "Main power supply.")
(4) Mount the upper covers. (Refer to 3.1.3, "Upper covers.")
(5) Mount the top cover. (Refer to 3.1.2, "Top cover.")
(6) Mount the operation panel. (Refer to 3.1.1, "Operation panel.")
(7) Mount the main controller. (Refer to 3.2.1, "Main controller.")

3.3 Upper block

3.3.1 Laser scanner unit

CAUTION: Before disassembling or reassembling any part, be sure to turn the power OFF and disconnect the power cord. Disassembling or reassembling with the power ON may result in trouble such as getting a shock.

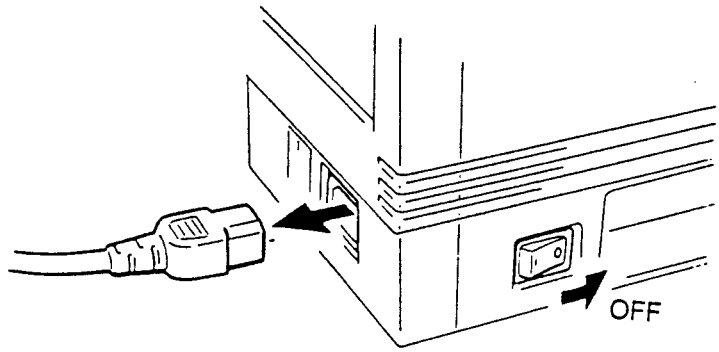


Fig. 5-43

WARNING:
- Be sure to use screwdrivers suitable for the respective screws. Otherwise the screws will be damaged.
- Replace parts and screws if damaged. Such parts may not only detract from the performance of the machine but also result in trouble.
- Remove the developer block, drum counter, and cleaning pad from the machine beforehand.
- Be sure to leave the removed drum (included in the developer block) and drum counter together.
- Note that exposing the drum surface directly to light will result in a drop in sensitivity of the drum (shorten its life). Wrap the removed drum unit with a soft cloth, etc.

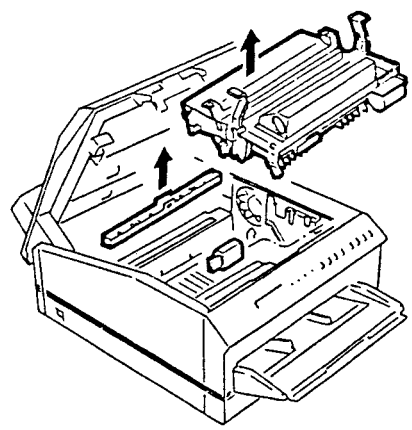


Fig. 5-44

Removal

WARNING: Dropping or giving shocks to the laser scanner can detract from the quality of print or cause a scanning failure. When removing or installing the laser scanner unit, be sure to hold the laser scanner unit firmly and not to drop it. Opening the cover of the laser scanner unit may result in dust entry the detract from the quality of print.

(1) Remove the top cover. (Refer to 3.1.2 "Top cover")
(2) Hold the laser scanner unit and remove the two set screws.
(3) Detach the one connector from the laser scanner unit and remove the laser scanner unit.

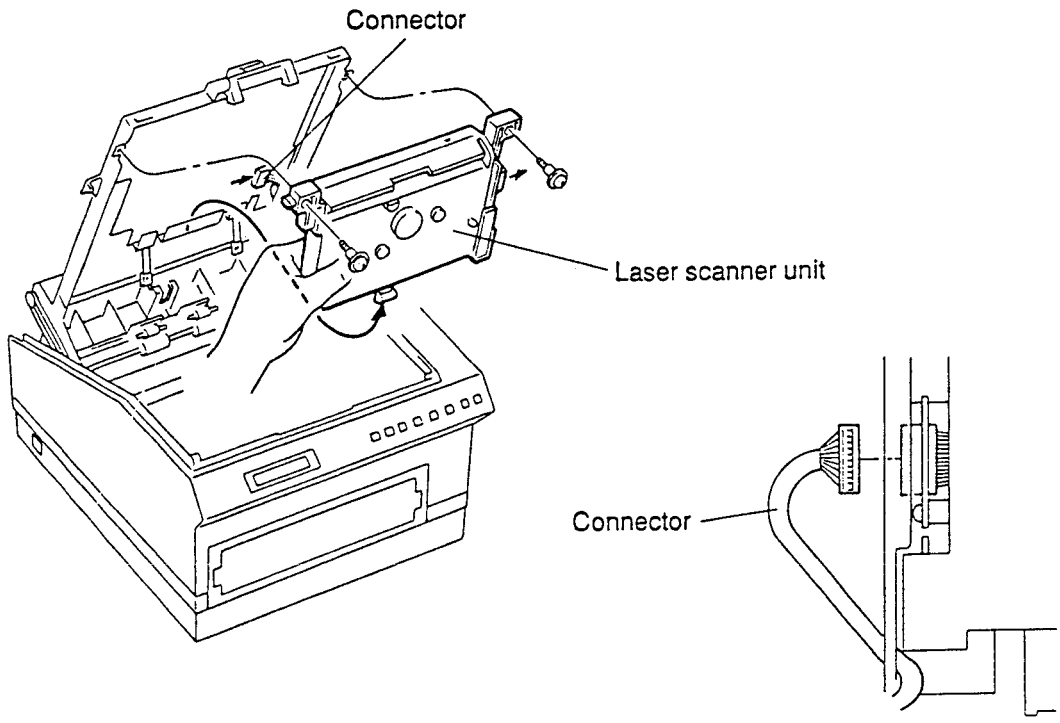


Fig. 5-45

Installation

(1) Attach the one connector to the laser scanner unit.
(2) Hook the laser scanner unit to the upper block.
(3) Secure the laser scanner unit using the two set screws.
(4) Mount the top cover. (Refer to 3.1.2 "Top cover")

3.3.2 Exit roller (B)

CAUTION: Before disassembling or reassembling any part, be sure to turn the power OFF and disconnect the power cord. Disassembling or reassembling with the power ON may result in trouble such as getting a shock.

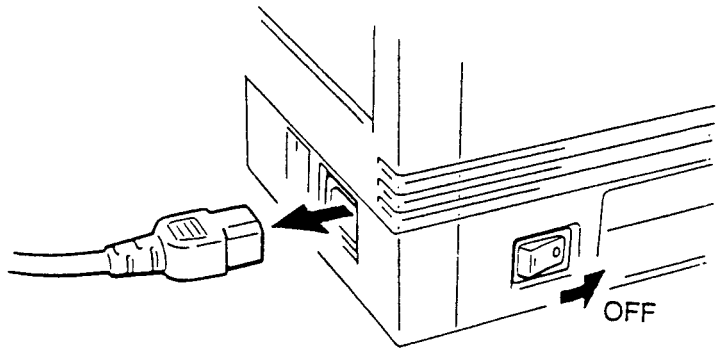


Fig. 5-46

WARNING:
- Be sure to use screwdrivers suitable for the respective screws. Otherwise the screws will be damaged.
- Replace parts and screws if damaged. Such parts may not only detract from the performance of the machine but also result in trouble.
- Remove the developer block, drum counter, and cleaning pad from the machine beforehand.
- Be sure to leave the removed drum (included in the developer block) and drum counter together.
- Note that exposing the drum surface directly to light will result in a drop in sensitivity of the drum (shorten its life). Wrap the removed drum unit with a soft cloth, etc.

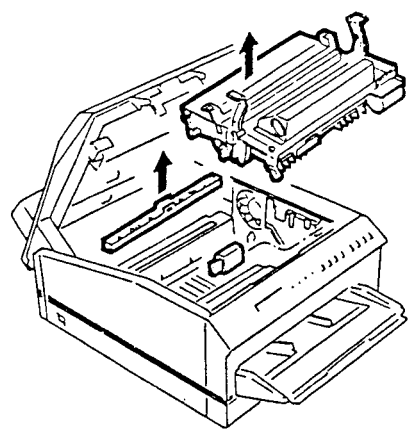


Fig. 5-47

Removal

(1) Remove the top cover. (Refer to 3.1.2, "Top cover.")
(2) Remove the exit belt.
(3) Remove the E-ring on the left or right sides of the roller shaft and remove exit roller (B).

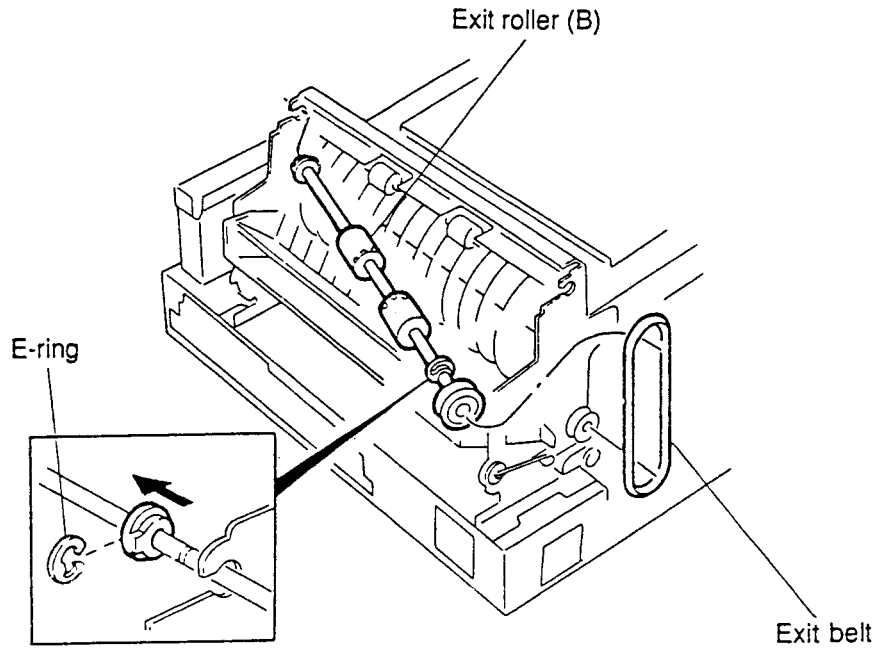


Fig. 5-48

Installation

(1) Mount exit roller (B) and fasten the left and right sides of the roller using the E-rings.
(2) Install the exit belt.
(3) Mount the top cover. (Refer to 3.1.2, "Top cover.")

3.3.3 Exit roller (A)

CAUTION: Before disassembling or reassembling any part, be sure to turn the power OFF and disconnect the power cord. Disassembling or reassembling with the power ON may result in trouble such as getting a shock.

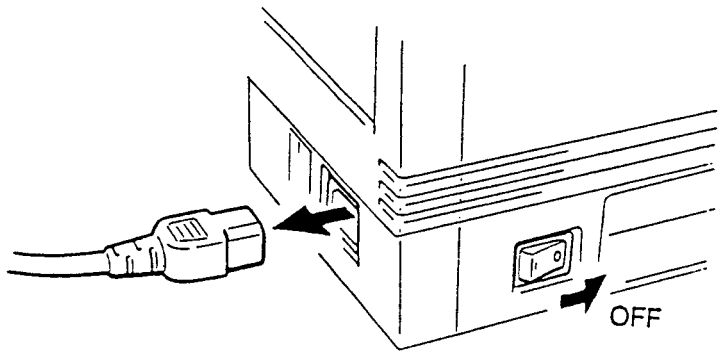


Fig. 5-49

WARNING:
- Replace parts and screws if damaged. Such parts may not only detract from the performance of the machine but also result in trouble.
- Remove the developer block, drum counter, and cleaning pad from the machine beforehand.
- Be sure to leave the removed drum (included in the developer block) and drum counter together.
- Note that exposing the drum surface directly to light will result in a drop in sensitivity of the drum (shorten its life). Wrap the removed drum unit with a soft cloth, etc.

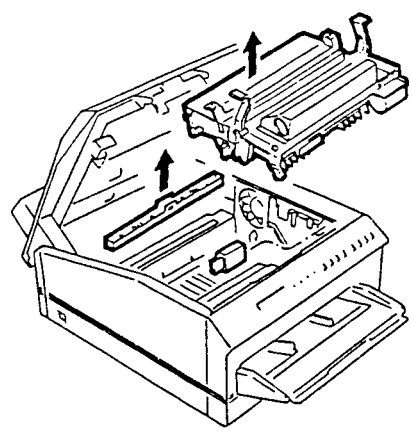


Fig. 5-50

Removal

(1) Remove the top cover. (Refer to 3.1.2, "Top cover.")
(2) Remove the exit belt.
(3) Remove the E-ring on the left and right sides of the roller shaft and remove exit roller (A).

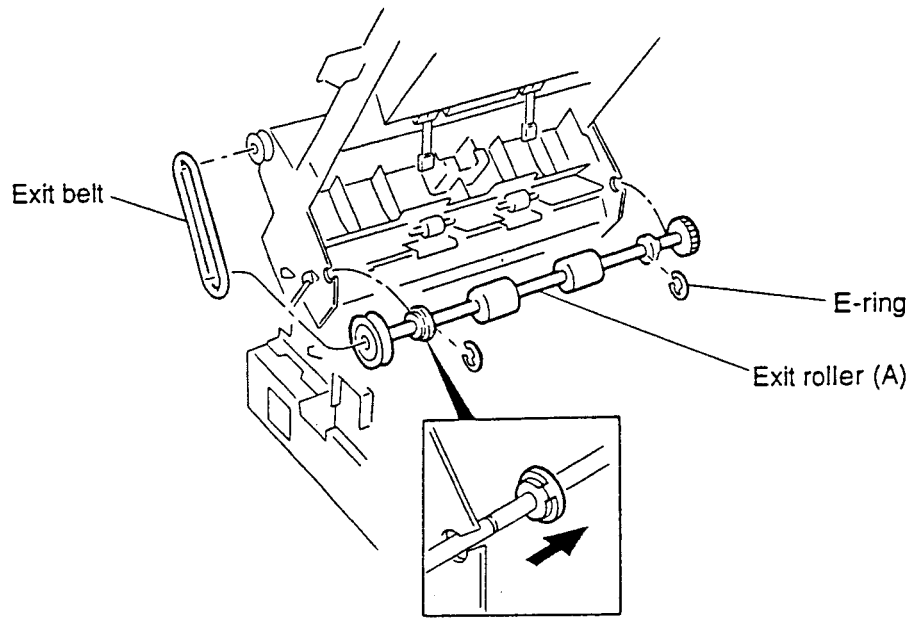


Fig. 5-51

Installation

(1) Mount exit roller (A) and fasten the left and right sides of the roller using the E-rings.
(2) Install the exit belt.
(3) Mount the top cover. (Refer to 3.1.2, "Top cover.")

3.4 Base block

3.4.1 Main motor

CAUTION: Before disassembling or reassembling any part, be sure to turn the power OFF and disconnect the power cord. Disassembling or reassembling with the power ON may result in trouble such as getting a shock.

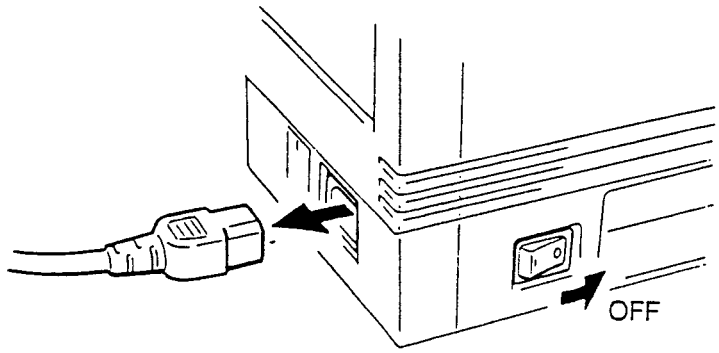


Fig. 5-52

WARNING:
- Be sure to use screwdrivers suitable for the respective screws. Otherwise the screws will be damaged.
- Replace parts and screws if damaged. Such parts may not only detract from the performance of the machine but also result in trouble.
- Remove the developer block, drum counter, and cleaning pad from the machine beforehand.
- Be sure to leave the removed drum (included in the developer block) and drum counter together.
- Note that exposing the drum surface directly to light will result in a drop in sensitivity of the drum (shorten its life). Wrap the removed drum unit with a soft cloth, etc.

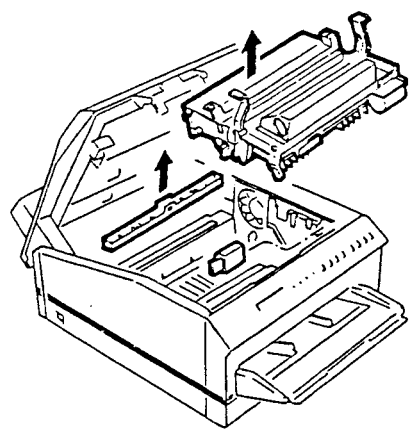


Fig. 5-53

Removal

(1) Remove the main controller. (Refer to 3.2.1, "Main controller.")
(2) Remove the operation panel. (Refer to 3.1.1, "Operation panel.")
(3) Remove the top cover. (Refer to 3.1.2, "Top cover.")
(4) Remove the upper covers. (Refer to 3.1.3, "Upper covers.")
(5) Remove the mechanical controller. (Refer to 3.2.2, "Mechanical controller.")
(6) Remove the two set screws securing the main motor and remove the main motor.

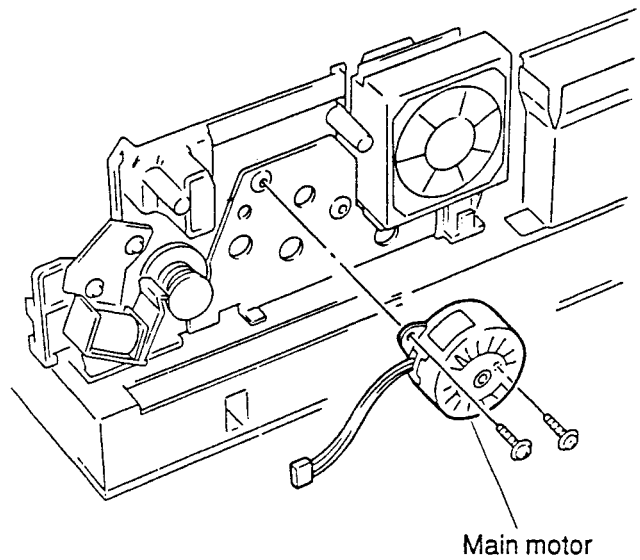


Fig. 5-54

Installation

(1) Set the main motor in position with the harness side up.
(2) Secure the main motor using the two set screws.
(3) Mount the mechanical controller. (Refer to 3.2.2, "Mechanical controller.")
(4) Mount the upper covers. (Refer to 3.1.3, "Upper covers.")
(5) Mount the top cover. (Refer to 3.1.2, "Top cover.")
(6) Mount the operation panel. (Refer to 3.1.1, "Operation panel.")
(7) Mount the main controller. (Refer to 3.2.1, "Main controller.")

3.4.2 Fan motor and ozone filter

CAUTION: Before disassembling or reassembling any part, be sure to turn the power OFF and disconnect the power cord. Disassembling or reassembling with the power ON may result in trouble such as getting a shock.

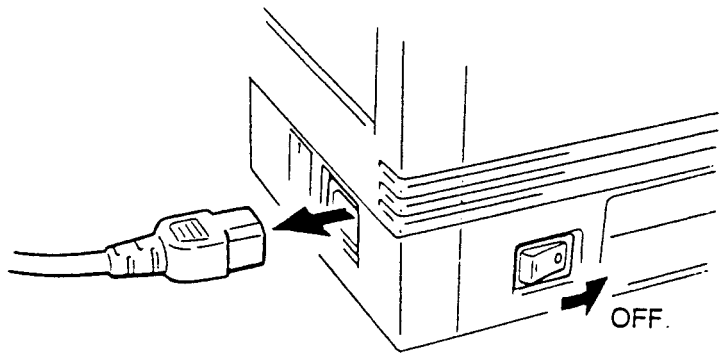


Fig. 5-55

WARNING:
- Replace parts and screws if damaged. Such parts may not only detract from the performance of the machine but also result in trouble.
- Remove the developer block, drum counter, and cleaning pad from the machine beforehand.
- Be sure to leave the removed drum (included in the developer block) and drum counter together.
- Note that exposing the drum surface directly to light will result in a drop in sensitivity of the drum (shorten its life). Wrap the removed drum unit with a soft cloth, etc.

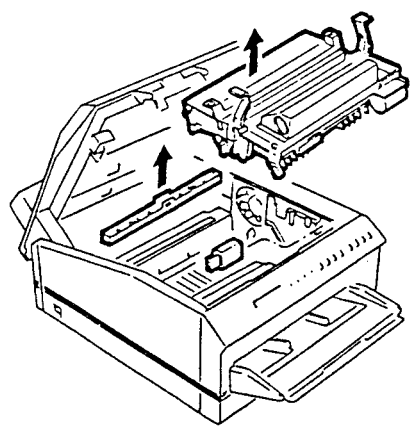


Fig. 5-56

Removal

WARNING: The ozone filter is easily damaged. Pressing or hitting the surface with the screwdriver, etc. can damage the filter.

(1) Remove the main controller. (Refer to 3.2.1, "Main controller.")
(2) Remove the operation panel. (Refer to 3.1.1, "Operation panel.")
(3) Remove the top cover. (Refer to 3.1.2, "Top cover.")
(4) Remove the upper covers. (Refer to 3.1.3, "Upper covers.")
(5) Detach the connector from CN14 on the mechanical controller.
(6) Press the left and right hooks of the fan motor cover and remove the cover.
(7) Remove the fan motor and the ozone filters.

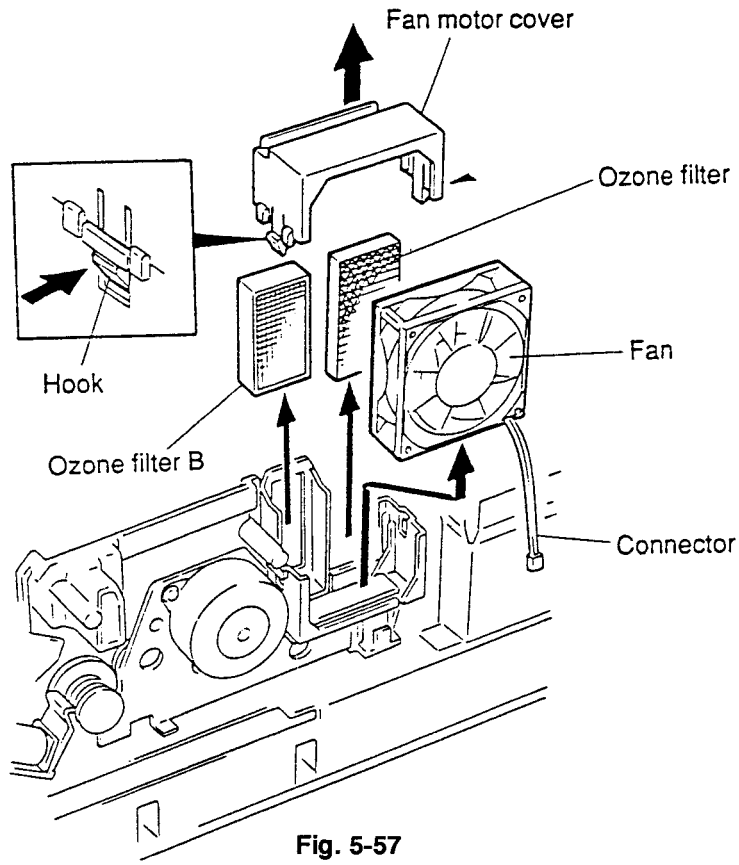


Fig. 5-57

Installation

(1) Mount the fan motor and the ozone filters.
(2) Mount the fan motor cover.
(3) Attach the connector to CN14 on the mechanical controller.
(4) Mount the upper covers. (Refer to 3.1.3, "Upper covers.")
(5) Mount the upper cover. (Refer to 3.1.2, "Top cover.")
(6) Mount the operation panel. (Refer to 3.1.1, "Operation panel.")
(7) Mount the main controller. (Refer to 3.2.1, "Main controller.")

3.4.3 Cassette feed solenoid

CAUTION: Before disassembling or reassembling any part, be sure to turn the power OFF and disconnect the power cord. Disassembling or reassembling with the power ON may result in trouble such as getting a shock.

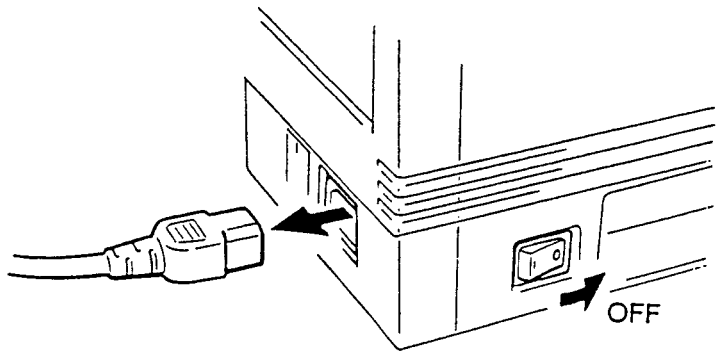


Fig. 5-58

WARNING:
- Be sure to use screwdrivers suitable for the respective screws. Otherwise the screws will be damaged.
- Replace parts and screws if damaged. Such parts may not only detract from the performance of the machine but also result in trouble.
- Remove the developer block, drum counter, and cleaning pad from the machine beforehand.
- Be sure to leave the removed drum (included in the developer block) and drum counter together.
- Note that exposing the drum surface directly to light will result in a drop in sensitivity of the drum (shorten its life). Wrap the removed drum unit with a soft cloth, etc.

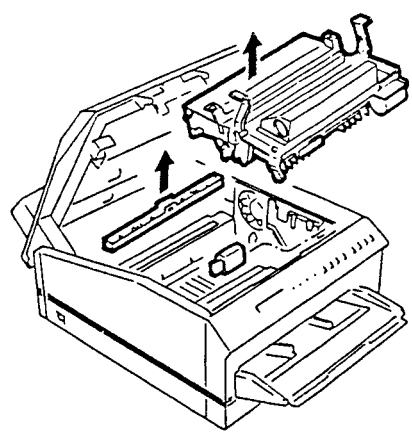


Fig. 5-59

Removal

Note: When mounting the cassette feed solenoid, adjustment of the mounting position is required.

(1) Remove the main controller. (Refer to 3.2.1, "Main controller.")
(2) Remove the operation panel. (Refer to 3.1.1, "Operation panel.")
(3) Remove the top cover. (Refer to 3.1.2, "Top cover.")
(4) Remove the upper covers. (Refer to 3.1.3, "Upper covers.")
(5) Remove the mechanical controller. (Refer to 3.2.2, "Mechanical controller.")
(6) Remove the two set screws of the cassette feed solenoid and remove the cassette feed solenoid.

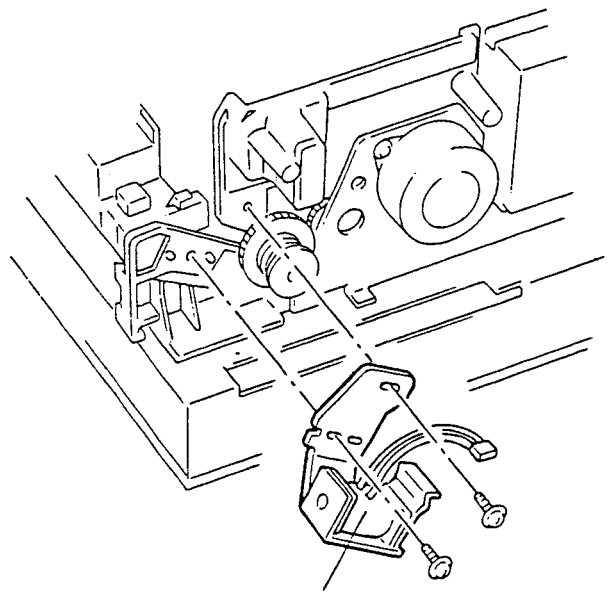


Fig. 5-60

Installation

(1) Attach the cassette feed solenoid and temporarily tighten the two set screws. Adjust the mounting position by referring to 4-1.
(2) Mount the mechanical controller. (Refer to 3.2.2, "Mechanical controller.")
(3) Mount the upper covers. (Refer to 3.1.3, "Upper covers.")
(4) Mount the top cover. (Refer to 3.1.2, "Top cover.")
(5) Mount the operation panel. (Refer to 3.1.1, "Operation panel.")
(6) Mount the main controller. (Refer to 3.2.1, "Main controller.")

3.4.4 Front frame

CAUTION: Before disassembling or reassembling any part, be sure to turn the power OFF and disconnect the power cord. Disassembling or reassembling with the power ON may result in trouble such as getting a shock.

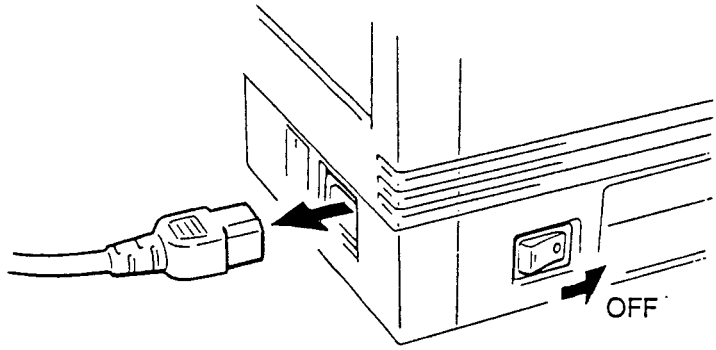


Fig. 5-61

WARNING:
- Be sure to use screwdrivers suitable for the respective screws. Otherwise the screws will be damaged.
- Replace parts and screws if damaged. Such parts may not only detract from the performance of the machine but also result in trouble.
- Remove the developer block, drum counter, and cleaning pad from the machine beforehand.
- Be sure to leave the removed drum (included in the developer block) and drum counter together.
- Note that exposing the drum surface directly to light will result in a drop in sensitivity of the drum (shorten its life). Wrap the removed drum unit with a soft cloth, etc.

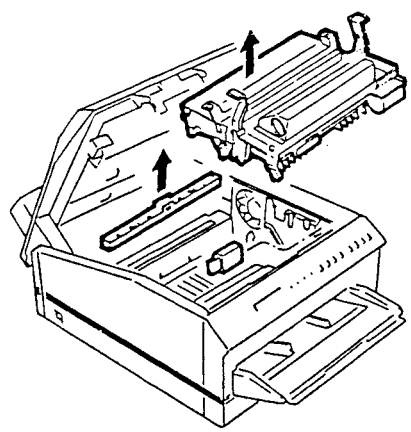


Fig. 5-62

Removal

(1) Mount the main controller. (Refer to 3.2.1, "Main controller.")
(2) Remove the operation panel. (Refer to 3.1.1, "Operation panel.")
(3) Remove the top cover. (Refer to 3.1.2, "Top cover.")
(4) Remove the upper covers. (Refer to 3.1.3, "Upper covers.")
(5) Remove the screws on the left and right sides of the printer base. Then remove the operation panel earth left and the operation panel earth right.
(6) Detach the connectors from CN6 and CN7 on the mechanical controller.
(7) Remove the one set screw on the left and right sides of the front frame. While slightly opening the left and right side frames, lift the front frame and release boss (A) on the left and right sides of the front frame from the side frames.

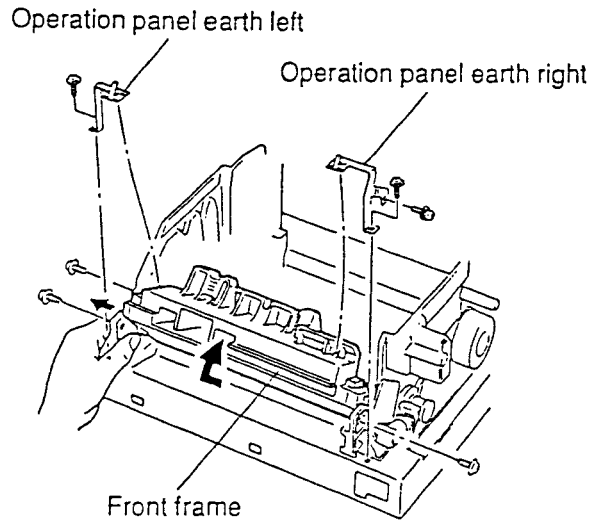


Fig. 5-63

(8) Remove the front frame.

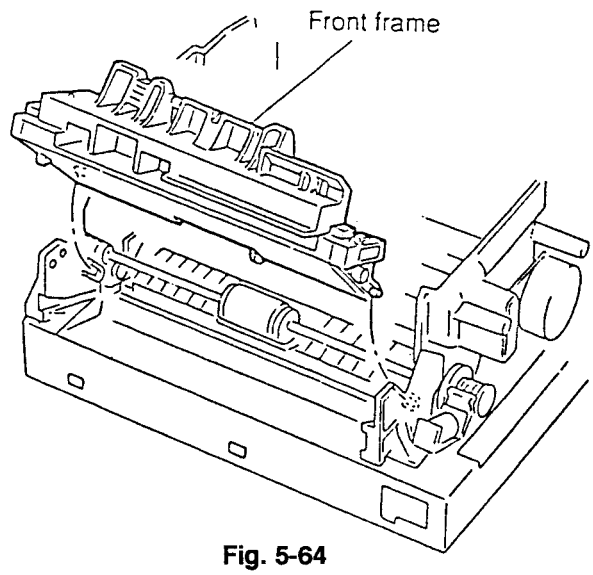


Fig. 5-64

Installation

(1) Insert boss (B) on the left and right sides of the front frame into the slots in the left and right side frames.
(2) While opening the left and right side frames, insert boss (A) on the left and right sides of the front frame into the left and right side frames.

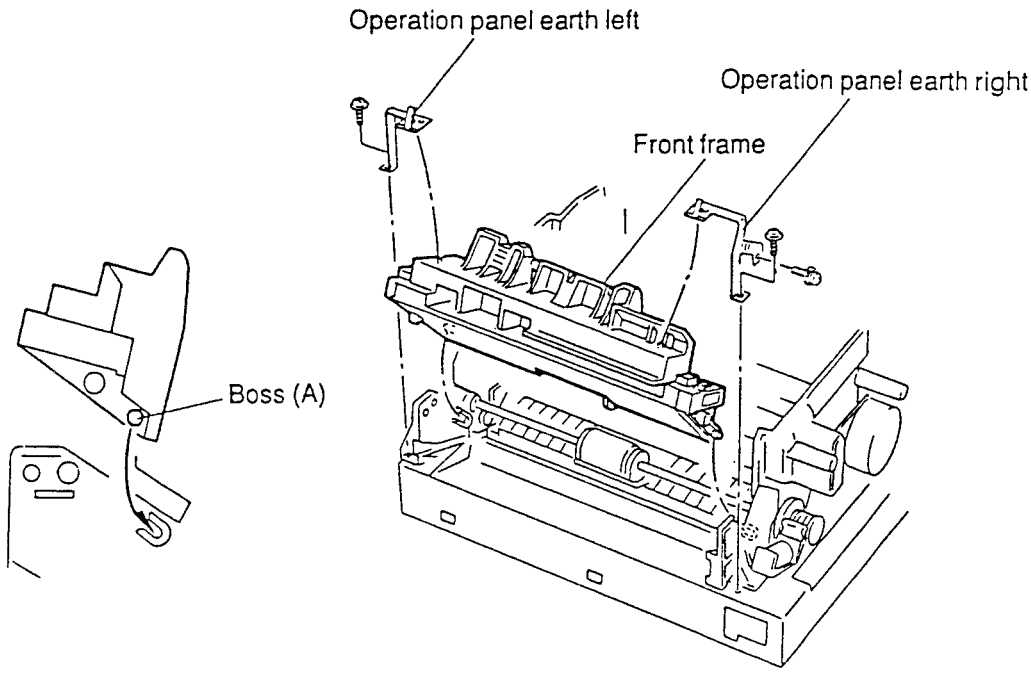


Fig. 5-65

(3) Tighten the two left and right set screws.
(4) Install the operation panel earth left and the operation panel earth right to the base plate using the set screws. (one screw for each.)
(5) Attach the two connectors to CN6 and CN7 on the mechanical controller.
(6) Mount the upper covers. (Refer to 3.1.3, "Upper covers.")
(7) Mount the top cover. (Refer to 3.1.2, "Top cover.")
(8) Mount the operation panel. (Refer to 3.1.1, "Operation panel.")
(9) Mount the main controller. (Refer to 3.2.1, "Main controller.")

3.4.5 Paper empty sensor

CAUTION: Before disassembling or reassembling any part, be sure to turn the power OFF and disconnect the power cord. Disassembling or reassembling with the power ON may result in trouble such as getting a shock.

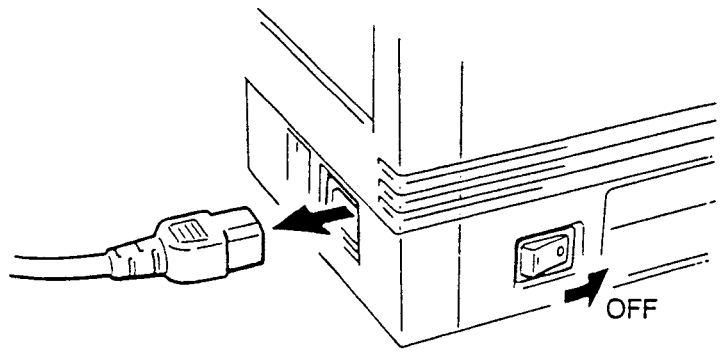


Fig. 5-66

WARNING:
- Replace parts and screws if damaged. Such parts may not only detract from the performance of the machine but also result in trouble.
- Remove the developer block, drum counter, and cleaning pad from the machine beforehand.
- Be sure to leave the removed drum (included in the developer block) and drum counter together.
- Note that exposing the drum surface directly to light will result in a drop in sensitivity of the drum (shorten its life). Wrap the removed drum unit with a soft cloth, etc.

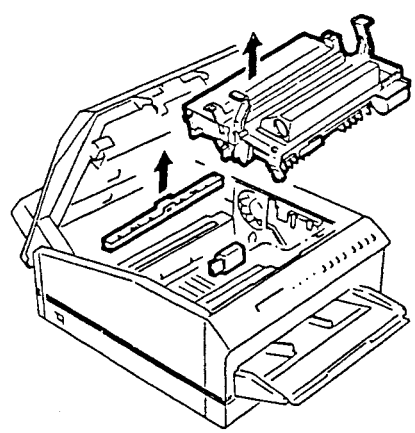


Fig. 5-67

Removal

(1) Remove the main controller. (Refer to 3.2.1, "Main controller.")
(2) Remove the operation panel. (Refer to 3.1.1, "Operation panel.")
(3) Remove the top cover. (Refer to 3.1.2, "Top cover.")
(4) Remove the upper covers. (Refer to 3.1.3, "Upper covers.")
(5) Remove the front frame. (Refer to 3.4.4, "Front frame.")
(6) Detach the one connector from the paper empty sensor on the inner side of the front frame.
(7) Press the four hooks of the paper empty sensor and remove the sensor from the front frame.

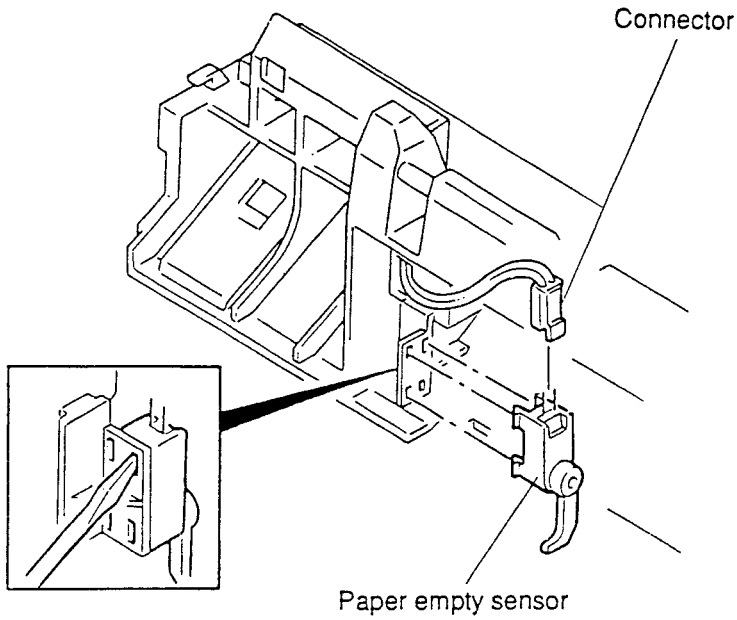


Fig. 5-68

Installation

(1) Insert the four hooks of the paper empty sensor into the front frame.
(2) Attach the connector to the paper empty sensor.
(3) Mount the front frame. (Refer to 3.4.4, "Front frame.")
(4) Mount the upper covers. (Refer to 3.1.3, "Upper covers.")
(5) Mount the top cover. (Refer to 3.1.2, "Top cover.")
(6) Mount the operation panel. (Refer to 3.1.1, "Operation panel.")
(7) Mount the main controller. (Refer to 3.2.1, "Main controller.")

3.4.6 Cassette feed roller

CAUTION: Before disassembling or reassembling any part, be sure to turn the power OFF and disconnect the power cord. Disassembling or reassembling with the power ON may result in trouble such as getting a shock.

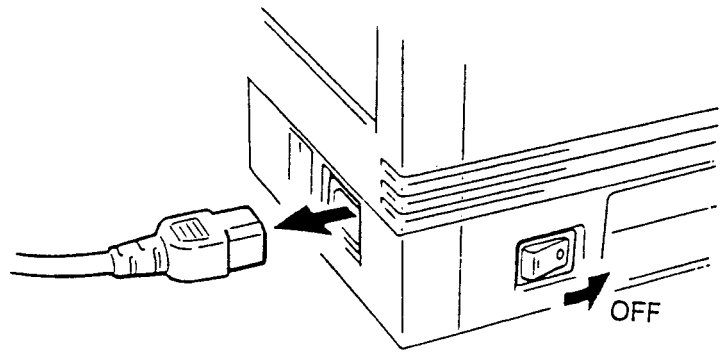


Fig. 5-69

WARNING:
- Be sure to use screwdrivers suitable for the respective screws. Otherwise the screws will be damaged.
- Replace parts and screws if damaged. Such parts may not only detract from the performance of the machine but also result in trouble.
- Remove the developer block, drum counter, and cleaning pad from the machine beforehand.
- Be sure to leave the removed drum (included in the developer block) and drum counter together.
- Note that exposing the drum surface directly to light will result in a drop in sensitivity of the drum (shorten its life). Wrap the removed drum unit with a soft cloth, etc.

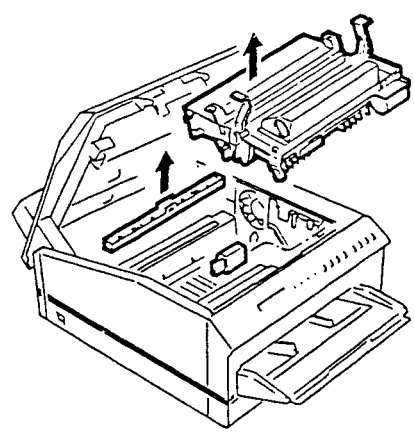


Fig. 5-70

Removal

Note: When mounting the cassette feed roller in its removal and installation, adjustment of the mounting position of the cassette feed solenoid is required.

(1) Remove the main controller. (Refer to 3.2.1, "Main controller.")
(2) Remove the operation panel. (Refer to 3.1.1, "Operation panel.")
(3) Remove the top cover. (Refer to 3.1.2, "Top cover.")
(4) Remove the upper covers. (Refer to 3.1.3, "Upper covers.")
(5) Remove the mechanical controller. (Refer to 3.2.2, "Mechanical controller.")
(6) Remove the cassette feed solenoid. (Refer to 3.4.3, "Cassette feed solenoid.")
(7) Remove the front frame. (Refer to 3.4.4, "Front frame.")
(8) Turn the shaft rock on the left and right sides of the cassette feed roller in the direction of A, align the shaft rock with the slot in the left and right side frames, and remove the cassette feed roller.

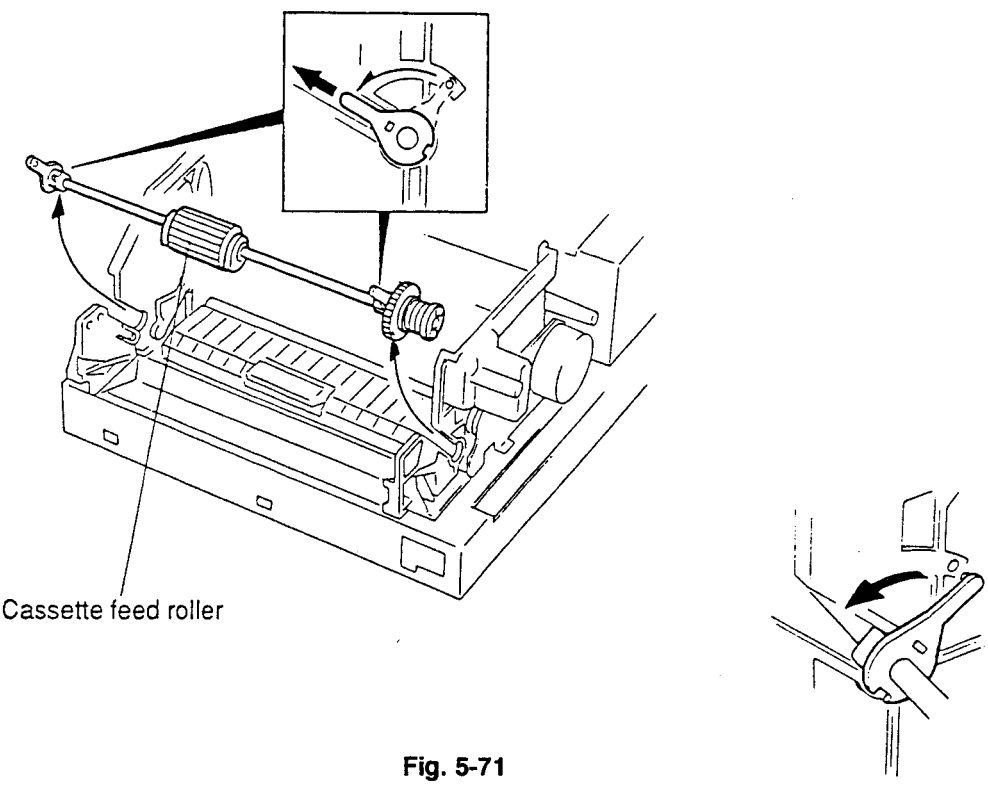


Fig. 5-71

Installation

(1) Align the shaft rock on the left and right sides of the cassette feed roller with the slot in the left and right side frames, and mount the cassette feed roller.
(2) Turn the shaft rock on the left and right sides of the cassette feed roller in the direction of A until the bosses are set in place to fasten.

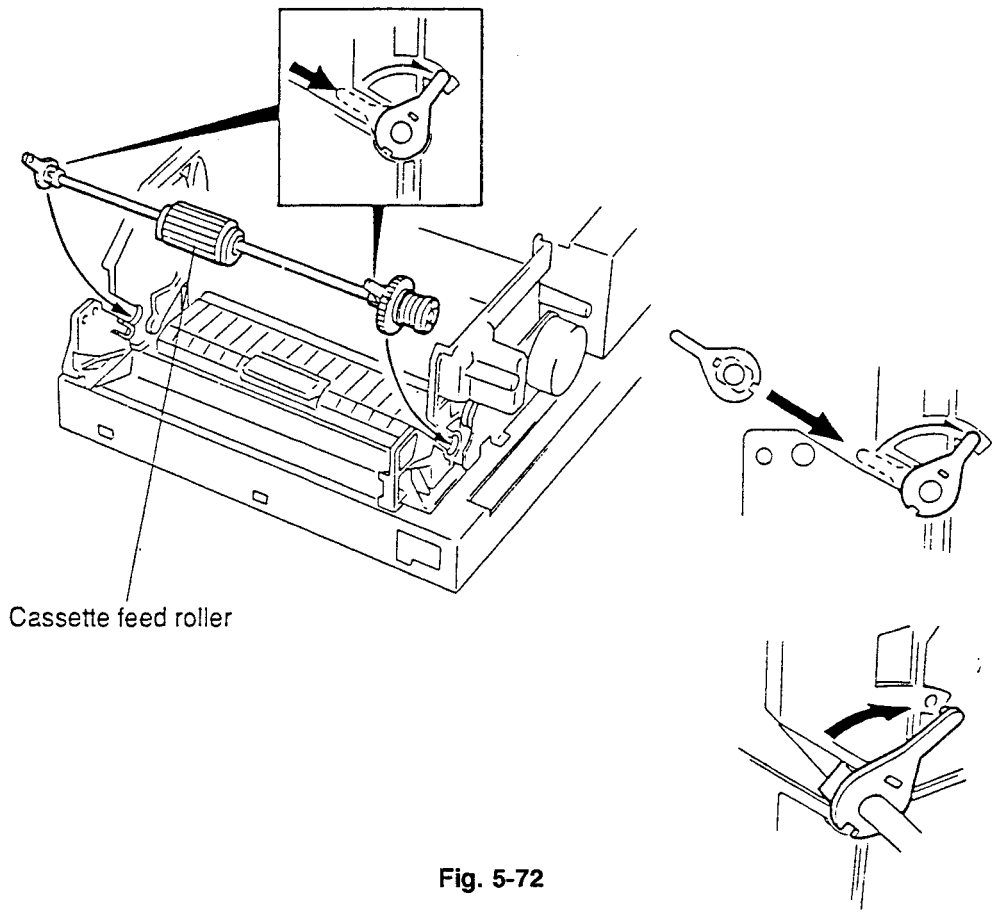


Fig. 5-72

(3) Mount the front frame. (Refer to 3.4.4, "Front frame.")
(4) Mount the cassette feed solenoid. (Refer to 3.4.3, "Cassette feed solenoid.") By referring to 4-1, adjust the mounting position of the cassette feed solenoid.
(5) Mount the mechanical controller. (Refer to 3.2.2, "Mechanical controller.")
(6) Mount the upper covers. (Refer to 3.1.3, "Upper covers.")
(7) Mount the top cover. (Refer to 3.1.2, "Top cover.")
(8) Mount the operation panel. (Refer to 3.1.1, "Operation panel.")
(9) Mount the main controller. (Refer to 3.2.1, "Main controller.")

3.4.7 Paper feed roller

CAUTION: Before disassembling or reassembling any part, be sure to turn the power OFF and disconnect the power cord. Disassembling or reassembling with the power ON may result in trouble such as getting a shock.

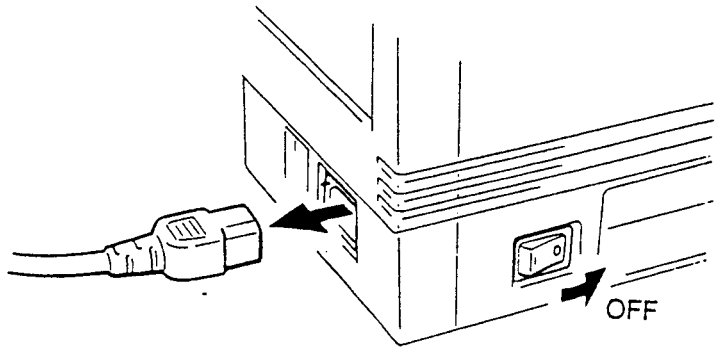


Fig. 5-73

WARNING:
- Be sure to use screwdrivers suitable for the respective screws. Otherwise the screws will be damaged.
- Replace parts and screws if damaged. Such parts may not only detract from the performance of the machine but also result in trouble.
- Remove the developer block, drum counter, and cleaning pad from the machine beforehand.
- Be sure to leave the removed drum (included in the developer block) and drum counter together.
- Note that exposing the drum surface directly to light will result in a drop in sensitivity of the drum (shorten its life). Wrap the removed drum unit with a soft cloth, etc.

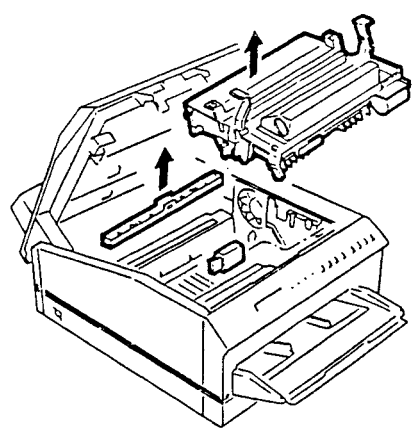


Fig. 5-74

Removal

(1) Remove the main controller. (Refer to 3.2.1, "Main controller.")
(2) Remove the operation panel. (Refer to 3.1.1, "Operation panel.")
(3) Remove the top cover. (Refer to 3.1.2, "Top cover.")
(4) Remove the upper covers. (Refer to 3.1.3, "Upper covers.")
(5) Remove the left and right pinch roller arm springs and remove the pinch roller arms from the frame.
(6) Remove the pinch roller.

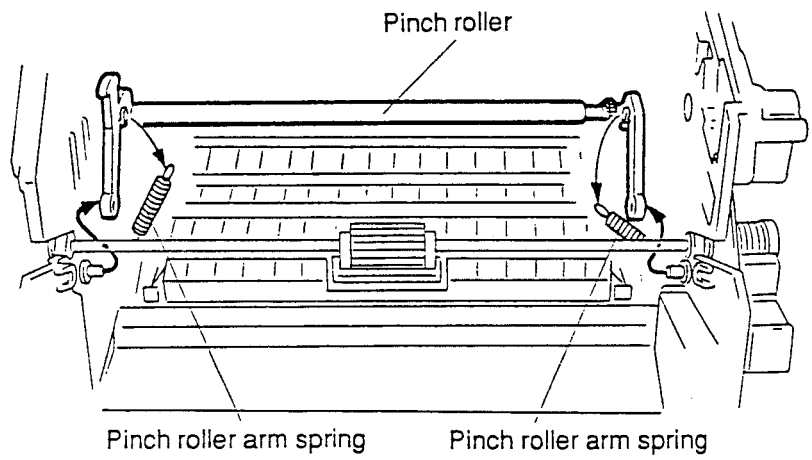


Fig. 5-75

(7) Remove the screw on the left side frame and remove the paper feed earth plate.
(8) Turn the shaft rock on the outer side of the left side frame in the direction of A, and remove the shaft rock by aligning it with the slot in the side frame.
(9) Move the paper feed roller to the left and lift it off.

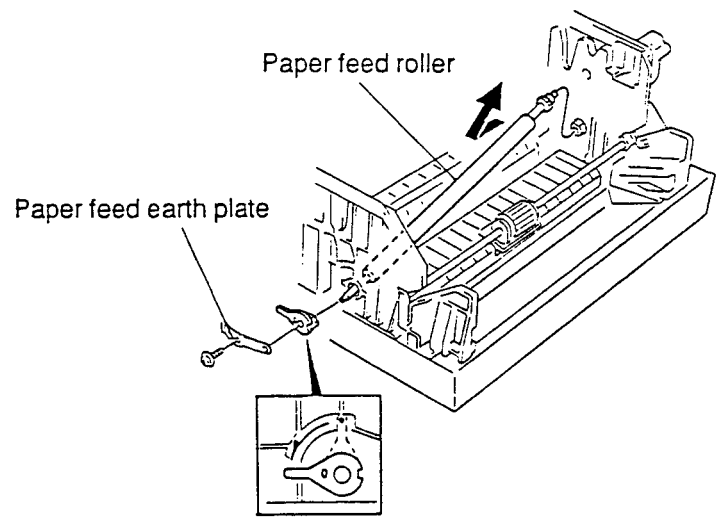


Fig. 5-76

Installation

(1) While inserting the paper feed roller into the hole in the left side frame, set the roller in place.
(2) Fit the plate on the right side of the paper feed roller to the plate of the shaft rock on the right side frame side and insert the paper feed roller into the shaft rock.

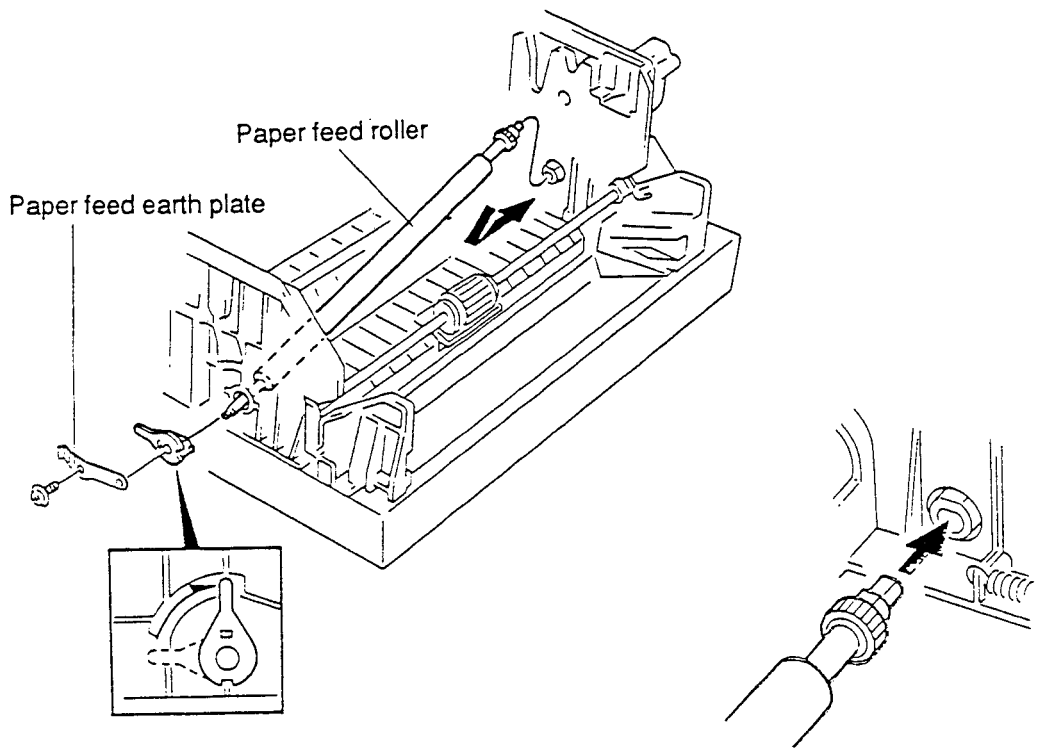


Fig. 5-77

(3) Mount the shaft rock from the outside of the left side frame.
(4) Mount the paper feed earth plate and secure it using the screw.
(5) Mount the pinch roller.
(6) Mount the upper covers. (Refer to 3.1.3, "Upper covers.")
(7) Mount the top cover. (Refer to 3.1.2, "Top cover.")
(8) Mount the operation panel. (Refer to 3.1.1, "Operation panel.")
(9) Mount the main controller. (Refer to 3.2.1, "Main controller.")

3.4.8 Transfer charger block

CAUTION: Before disassembling or reassembling any part, be sure to turn the power OFF and disconnect the power cord. Disassembling or reassembling with the power ON may result in trouble such as getting a shock.

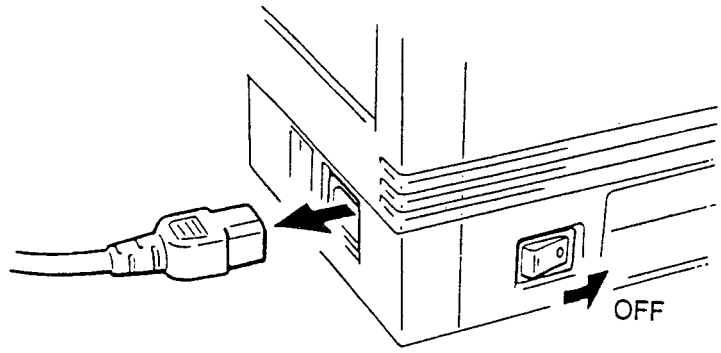


Fig. 5-78

WARNING:
- Be sure to use screwdrivers suitable for the respective screws. Otherwise the screws will be damaged.
- Replace parts and screws if damaged. Such parts may not only detract from the performance of the machine but also result in trouble.
- Remove the developer block, drum counter, and cleaning pad from the machine beforehand.
- Be sure to leave the removed drum (included in the developer block) and drum counter together.
- Note that exposing the drum surface directly to light will result in a drop in sensitivity of the drum (shorten its life). Wrap the removed drum unit with a soft cloth, etc.

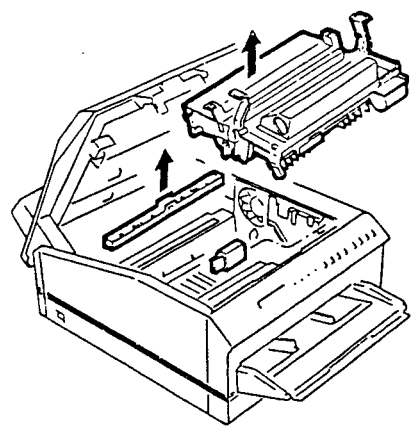


Fig. 5-79

Removal

WARNING: Be careful not to break the transfer charger wire and discharger wire.

(1) Remove the two set screws of the transfer charger block and remove the transfer charger block.

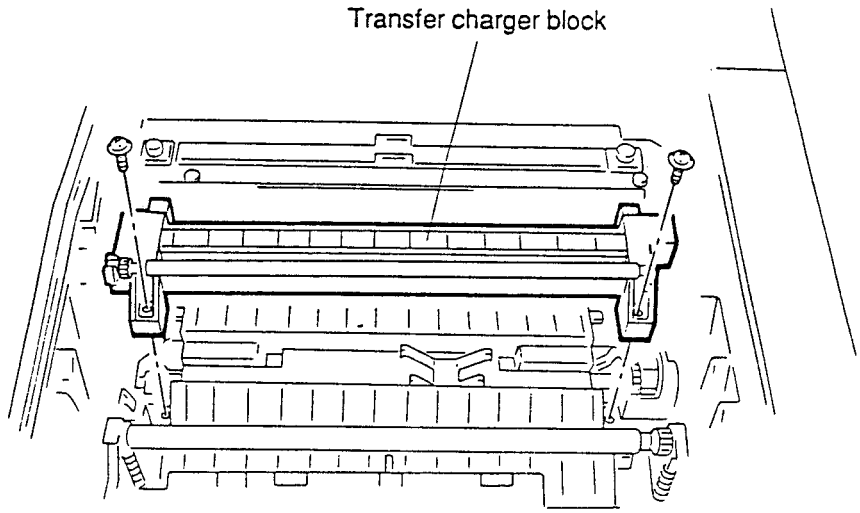


Fig. 5-80

Installation

(1) Set the transfer charger block in place and secure the blockusing the two set screws. At this time, the hooks of the transfer charger block must be caught by the base paper guide.

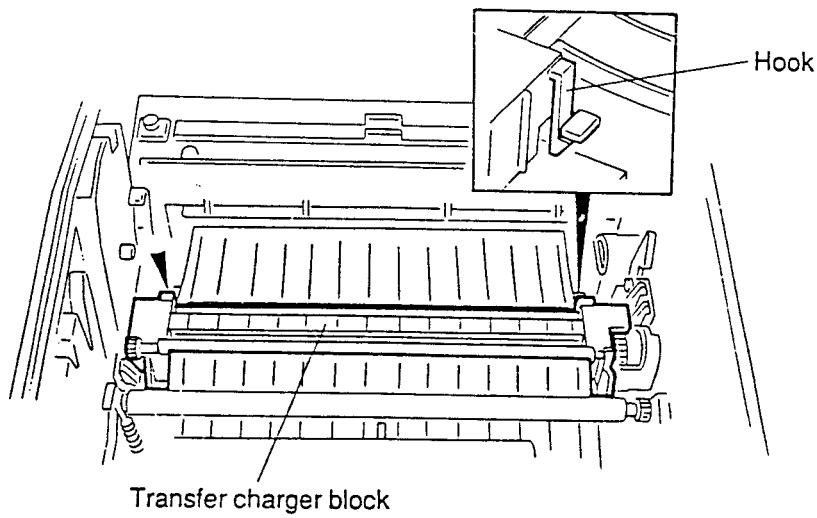


Fig. 5-81

3.4.9 Friction plate

CAUTION: Before disassembling or reassembling any part, be sure to turn the power OFF and disconnect the power cord. Disassembling or reassembling with the power ON may result in trouble such as getting a shock.

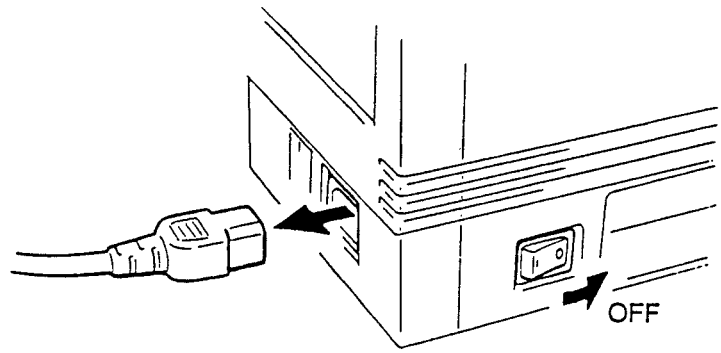


Fig. 5-82

WARNING:
- Be sure to use screwdrivers suitable for the respective screws. Otherwise the screws will be damaged.
- Replace parts and screws if damaged. Such parts may not only detract from the performance of the machine but also result in trouble.
- Remove the developer block, drum counter, and cleaning pad from the machine beforehand.
- Be sure to leave the removed drum (included in the developer block) and drum counter together.
- Note that exposing the drum surface directly to light will result in a drop in sensitivity of the drum (shorten its life). Wrap the removed drum unit with a soft cloth, etc.

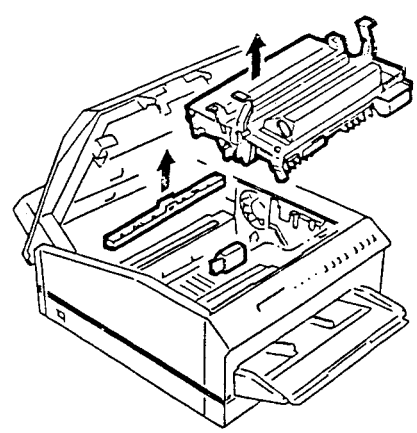


Fig. 5-83

Removal

WARNING: When removing the friction plate, be careful not to make the friction spring jump.

Note: When mounting the friction plate in its removal and installation, adjustment of the mounting position of the cassette feed solenoid is required.

(1) Remove the main controller. (Refer to 3.2.1, "Main controller.")
(2) Remove the operation panel. (Refer to 3.1.1, "Operation panel.")
(3) Remove the top cover. (Refer to 3.1.2, "Top cover.")
(4) Remove the upper covers. (Refer to 3.1.3, "Upper covers.")
(5) Remove the mechanical controller. (Refer to 3.2.2, "Mechanical controller.")
(6) Remove the cassette feed solenoid. (Refer to 3.4.3, "Cassette feed solenoid.")
(7) Remove the front frame. (Refer to 3.4.4, "Front frame.")
(8) Remove the cassette feed roller. (Refer to 3.4.6, "Cassette feed roller.")
(9) Open the hooks of the front paper guide and raise the friction plate.
(10) Align the boss on the left and right sides of the friction plate with the slot in the front paper guide, then lift the friction plate off.

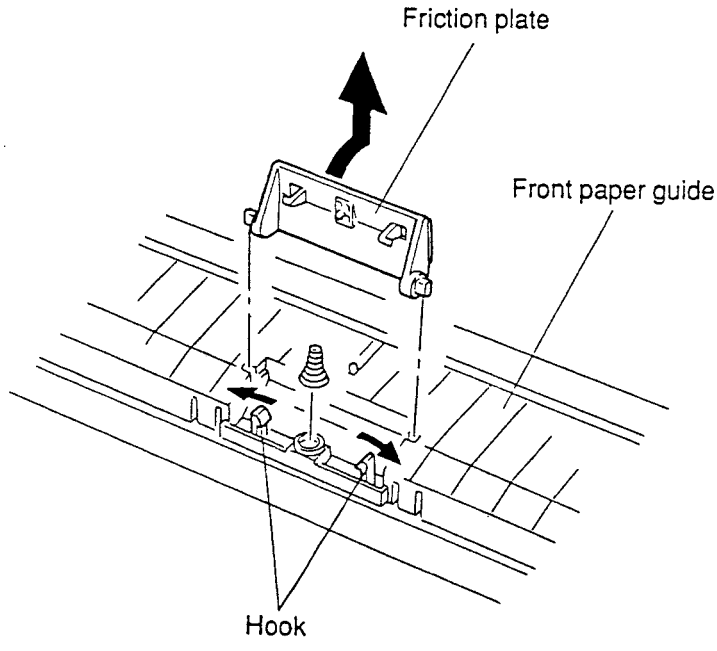


Fig. 5-84

Installation

(1) Insert the friction plate into the front paper guide.
(2) Set the friction spring in position and fit the friction plate to the hooks of the front paper guide.
(3) Mount the cassette feed roller. (Refer to 3.4.6, "Cassette feed roller.")
(4) Mount the front frame. (Refer to 3.4.4, "Front frame.")
(5) Mount the cassette feed solenoid. (Refer to 3.4.3, "Cassettefeed solenoid.") By referring to 4-1, adjust the mounting position of the cassette feed solenoid.
(6) Mount the mechanical controller. (Refer to 3.2.2, "Mechanical controller.")
(7) Mount the upper covers. (Refer to 3.1.3, "Upper covers.")
(8) Mount the top cover. (Refer to 3.1.2, "Top cover.")
(9) Mount the operation panel. (Refer to 3.1.1, "Operation panel.")
(10) Mount the main controller. (Refer to 3.2.1, "Main controller.")

3.4.10 Front paper guide

CAUTION: Before disassembling or reassembling any part, be sure to turn the power OFF and disconnect the power cord. Disassembling or reassembling with the power ON may result in trouble such as getting a shock.

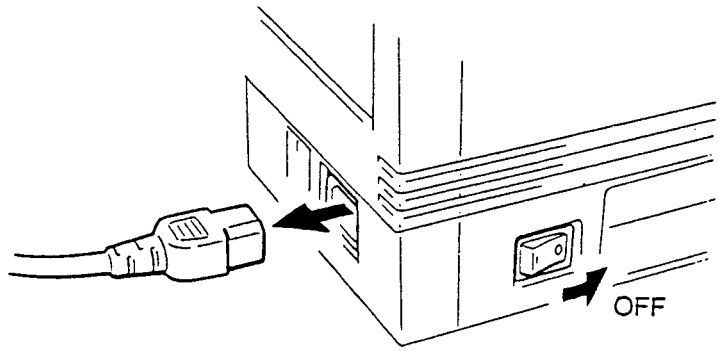


Fig. 5-85

WARNING:
- Be sure to use screwdrivers suitable for the respective screws. Otherwise the screws will be damaged.
- Replace parts and screws if damaged. Such parts may not only detract from the performance of the machine but also result in trouble.
- Remove the developer block, drum counter, and cleaning pad from the machine beforehand.
- Be sure to leave the removed drum (included in the developer block) and drum counter together.
- Note that exposing the drum surface directly to light will result in a drop in sensitivity of the drum (shorten its life). Wrap the removed drum unit with a soft cloth, etc.

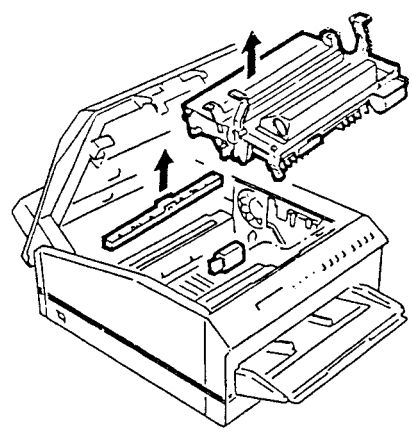


Fig. 5-86

Removal

Note: When mounting the front paper guide, adjustment of the mounting position of the cassette feed solenoid is required.

(1) Remove the main controller. (Refer to 3.2.1, "Main controller.")
(2) Remove the operation panel. (Refer to 3.1.1, "Operation panel.")
(3) Remove the top cover. (Refer to 3.1.2, "Top cover.")
(4) Remove the upper covers. (Refer to 3.1.3, "Upper covers.")
(5) Remove the mechanical controller. (Refer to 3.2.2, "Mechanical controller.")
(6) Remove the cassette feed solenoid. (Refer to 3.4.3, "Cassette feed solenoid.")
(7) Remove the front frame. (Refer to 3.4.4, "Front frame.")
(8) Remove the cassette feed roller. (Refer to 3.4.7, "Cassette feed roller.")
(9) Pressing the two hooks at the center of the front paper guide, lift the guide in the direction of the arrow.
(10) Pressing the arm on the left and right sides of the front paper guide, remove the front paper guide.

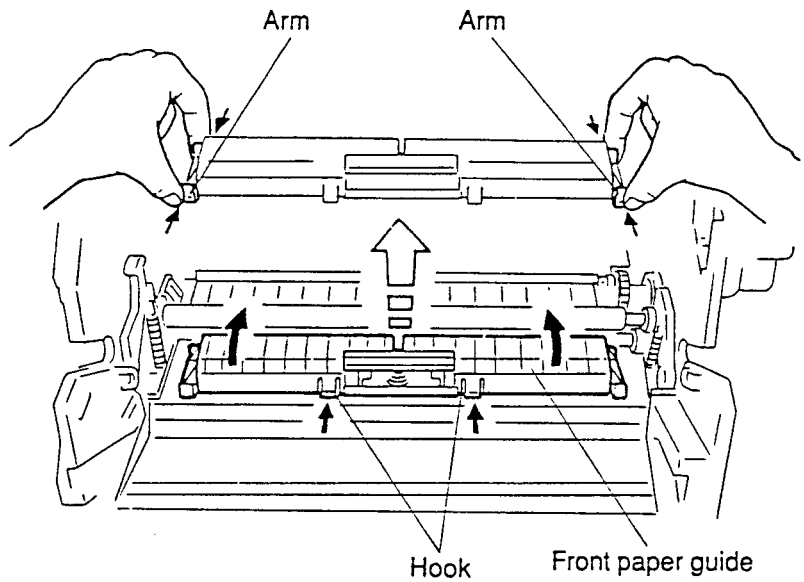


Fig. 5-87

Installation

WARNING: A failure to align the slot in the front paper guide with the feed sensor arm can break the feed sensor arm.

(1) Being careful of the feed sensor arm, align with and insert the six hooks of the front paper guide into the holes in the bottom plate.

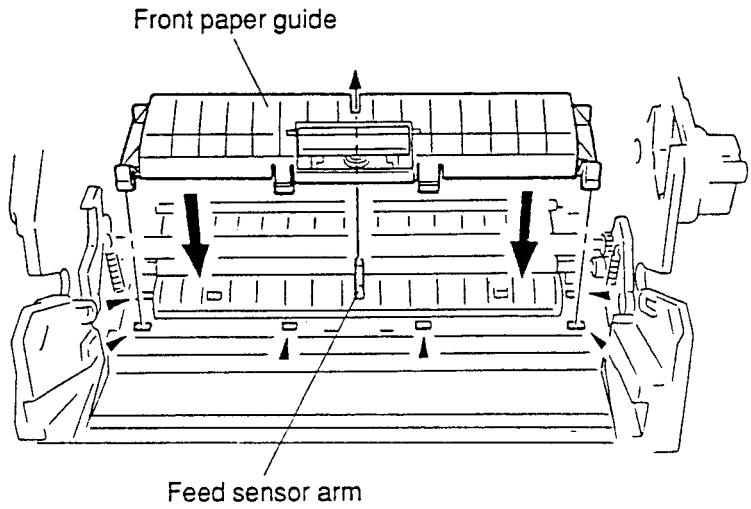


Fig. 5-88

(2) Mount the cassette feed roller. (Refer to 3.4.6, "Cassette feed roller.")
(3) Mount the front frame. (Refer to 3.4.4, "Front frame.")
(4) Mount the cassette feed solenoid. (Refer to 3.4.3, "Cassette feed solenoid.") By referring to 4-1, adjust the mounting position of the cassette feed solenoid.
(5) Mount the mechanical controller. (Refer to 3.2.2, "Mechanical controller.")
(6) Mount the upper covers. (Refer to 3.1.3, "Upper covers.")
(7) Mount the top cover. (Refer to 3.1.2, "Top cover.")
(8) Mount the operation panel. (Refer to 3.1.1, "Operation panel.")
(9) Mount the main controller. (Refer to 3.2.1, "Main controller.")

3.4.11 Base paper guide

CAUTION: Before disassembling or reassembling any part, be sure to turn the power OFF and disconnect the power cord. Disassembling or reassembling with the power ON may result in trouble such as getting a shock.

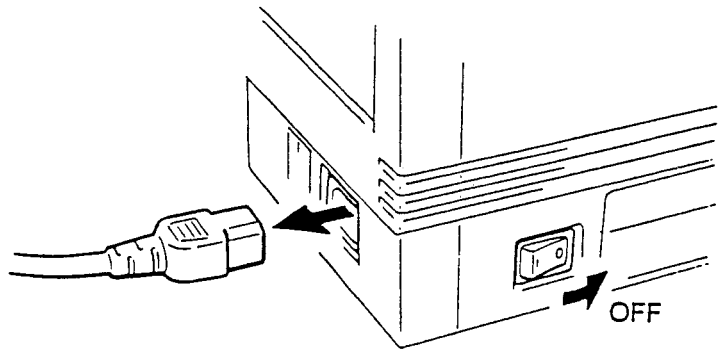


Fig. 5-89

WARNING:
- Be sure to use screwdrivers suitable for the respective screws. Otherwise the screws will be damaged.
- Replace parts and screws if damaged. Such parts may not only detract from the performance of the machine but also result in trouble.
- Remove the developer block, drum counter, and cleaning pad from the machine beforehand.
- Be sure to leave the removed drum (included in the developer block) and drum counter together.
- Note that exposing the drum surface directly to light will result in a drop in sensitivity of the drum (shorten its life). Wrap the removed drum unit with a soft cloth, etc.

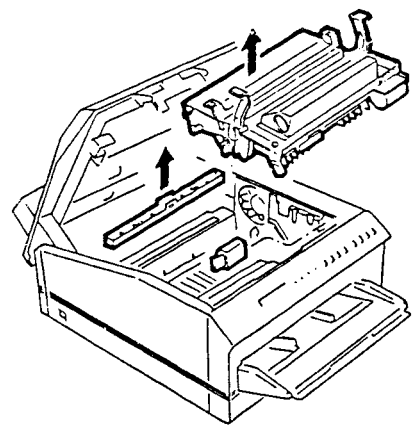


Fig. 5-90

Removal

Note: When mounting the base paper guide in its removal and installation, adjustment of the mounting position of the cassette feed solenoid is required.

(1) Remove the main controller. (Refer to 3.2.1, "Main controller.")
(2) Remove the operation panel. (Refer to 3.1.1, "Operation panel.")
(3) Remove the top cover. (Refer to 3.1.2, "Top cover.")
(4) Remove the upper covers. (Refer to 3.1.3, "Upper covers.")
(5) Remove the mechanical controller. (Refer to 3.2.2, "Mechanical controller.")
(6) Remove the cassette feed solenoid. (Refer to 3.4.3, "Cassette feed solenoid.")
(7) Remove the front frame. (Refer to 3.4.4, "Front frame.")
(8) Remove the cassette feed roller. (Refer to 3.4.6, "Cassette feed roller.")
(9) Remove the paper feed roller. (Refer to 3.4.8, "Paper feed roller.")
(10) Remove the transfer charger block. (Refer to 3.4.8, "Transfer charger block.")
(11) Remove the front paper guide. (Refer to 3.4.10, "Front paper guide.")
(12) Pressing the two hooks of the base paper guide, remove the guide in the direction of the arrow.

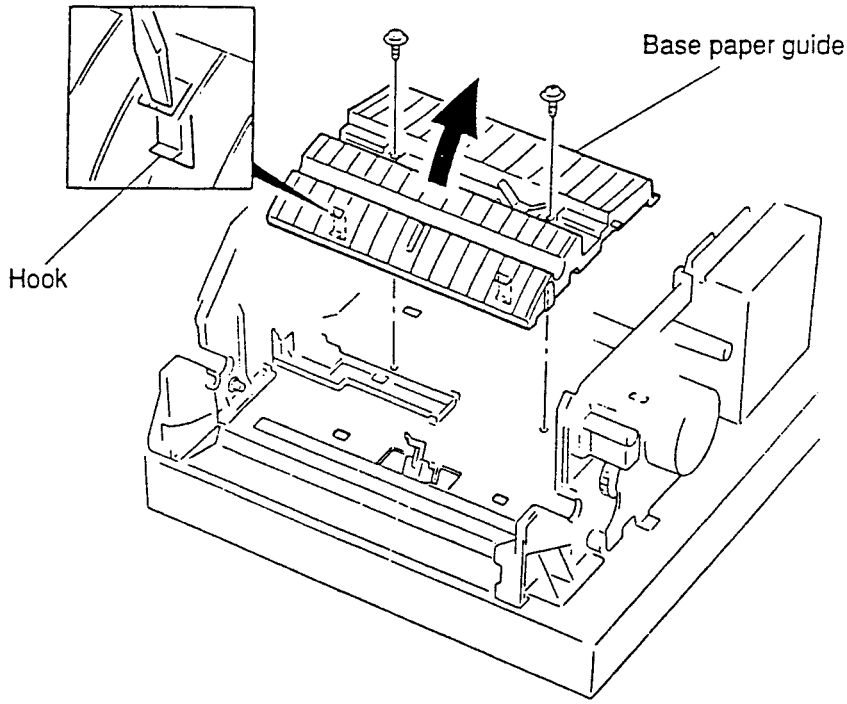


Fig. 5-91

Installation

WARNING: A failure to align the slot in the base paper guide with the fed sensor arm can break the feed sensor arm.

(1) Being careful of the feed sensor arm, insert the three hooks of the base paper guide into the holes in the base plate.
(2) Insert the two hooks of the base paper guide into the holes in the base plate and mount the base paper guide.

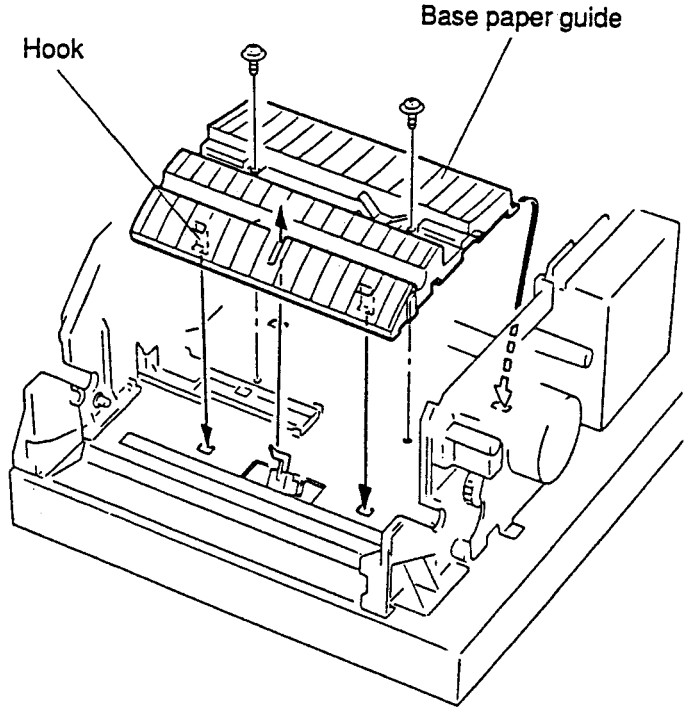


Fig. 5-92

(3) Mount the front paper guide. (Refer to 3.4.10, "Front paper guide.")
(4) Mount the transfer charger block. (Refer to 3.4.8, "Transfer charger block.")
(5) Mount the paper feed roller. (Refer to 3.4.7, "Paper feed roller.")
(6) Mount the cassette feed roller. (Refer to 3.4.6, "Cassette feed roller.")
(7) Mount the front frame. (Refer to 3.4.4, "Front frame.")
(8) Mount the cassette feed solenoid. (Refer to 3.4.3, "Cassettefeed solenoid.") By referring to 4-1, adjust the mounting position of the cassette feed solenoid.
(9) Mount the mechanical controller. (Refer to 3.2.2, "Mechanical controller.")
(10) Mount the upper covers. (Refer to 3.1.3, "Upper covers.")
(11) Mount the top cover. (Refer to 3.1.2, "Top cover.")
(12) Mount the operation panel. (Refer to 3.1.1, "Operation panel.")
(13) Mount the main controller. (Refer to 3.2.1, "Main controller.")

3.4.12 Side frame left

CAUTION: Before disassembling or reassembling any part, be sure to turn the power OFF and disconnect the power cord. Disassembling or reassembling with the power ON may result in trouble such as getting a shock.

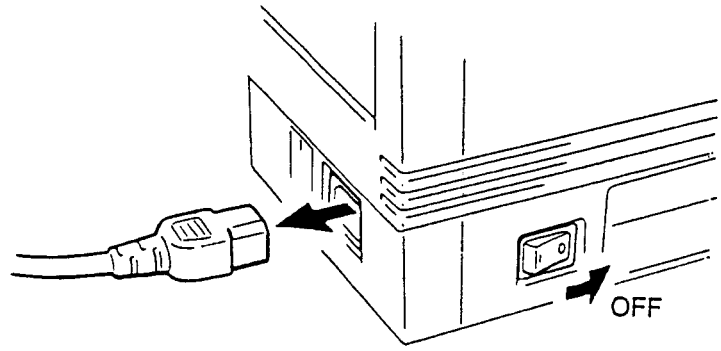


Fig. 5-93

WARNING:
- Be sure to use screwdrivers suitable for the respective screws. Otherwise the screws will be damaged.
- Replace parts and screws if damaged. Such parts may not only detract from the performance of the machine but also result in trouble.
- Remove the developer block, drum counter, and cleaning pad from the machine beforehand.
- Be sure to leave the removed drum (included in the developer block) and drum counter together.
- Note that exposing the drum surface directly to light will result in a drop in sensitivity of the drum (shorten its life). Wrap the removed drum unit with a soft cloth, etc.

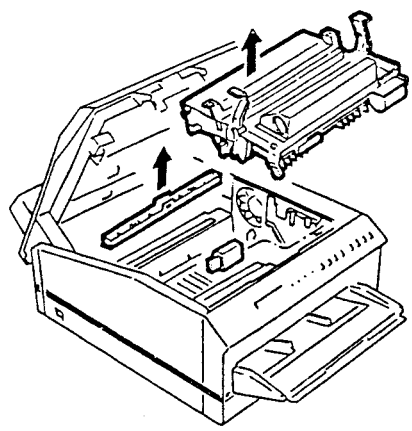


Fig. 5-94

Removal

Note: When mounting the side frame left in its removal and installation, adjustment of the mounting position of the cassette feed solenoid is required.

(1) Remove the main controller. (Refer to 3.2.1, "Main controller.")
(2) Remove the operation panel. (Refer to 3.1.1, "Operation panel.")
(3) Remove the top cover. (Refer to 3.1.2, "Top cover.")
(4) Remove the upper covers. (Refer to 3.1.3, "Upper covers.")
(5) Remove the mechanical controller. (Refer to 3.2.2, "Mechanical controller.")
(6) Remove the cassette feed solenoid. (Refer to 3.4.3, "Cassette feed solenoid.")
(7) Remove the front frame. (Refer to 3.4.4, "Front frame.")
(8) Remove the cassette feed roller. (Refer to 3.4.6, "Cassette feed roller.")
(9) Remove the paper feed roller. (Refer to 3.4.7, "Paper feed roller.")
(10) Remove the three set screws of the side frame left and remove the side frame (left).

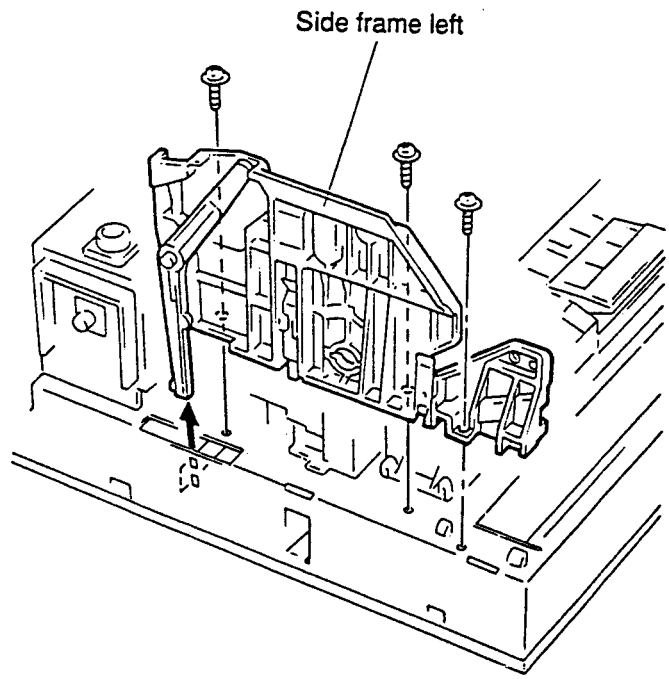


Fig. 5-95

Installation

CAUTION: A failure to set the cover open sensor arm in position when mounting the side frame will make the cover open sensor inactive after the assembly.

(1) Mount the side frame so that the cover open sensor arm will be placed on the arrow side of the cover open switch.

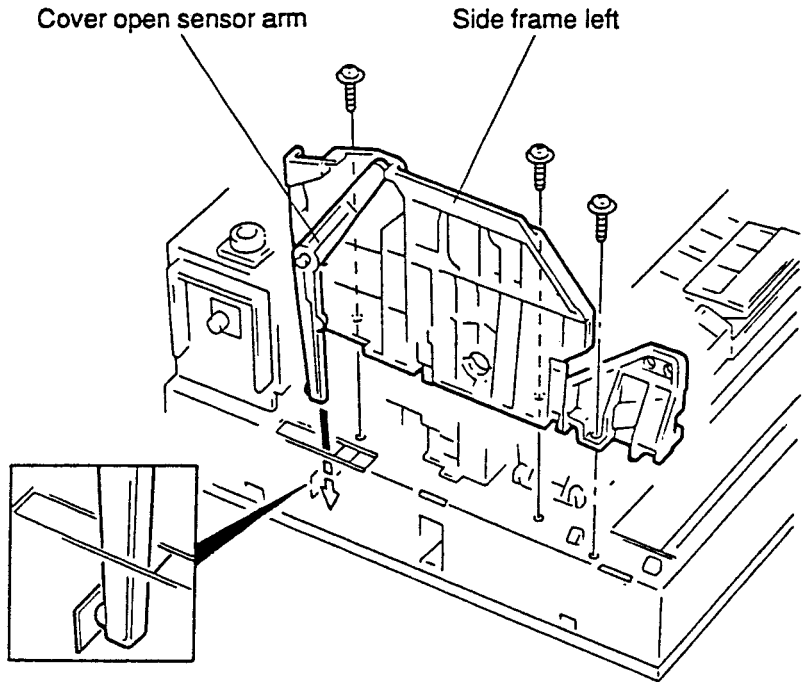


Fig. 5-96

(2) Tighten the three set screws.
(3) Mount the paper feed roller. (Refer to 3.4.7, "Paper feed roller.")
(4) Mount the cassette feed roller. (Refer to 3.4.6, "Cassette feed roller.")
(5) Mount the front frame. (Refer to 3.4.4, "Front frame.")
(6) Mount the cassette feed solenoid. (Refer to 3.4.3, "Cassettefeed solenoid.") By referring to 4-1, adjust the mounting position of the cassette feed solenoid.
(7) Mount the mechanical controller. (Refer to 3.2.2, "Mechanical controller.")
(8) Mount the upper covers. (Refer to 3.1.3, "Upper covers.")
(9) Mount the top cover. (Refer to 3.1.2, "Top cover.")
(10) Mount the operation panel. (Refer to 3.1.1, "Operation panel.")
(11) Mount the main controller. (Refer to 3.2.1, "Main controller.")

3.4.13 Side frame right block

CAUTION: Before disassembling or reassembling any part, be sure to turn the power OFF and disconnect the power cord. Disassembling or reassembling with the power ON may result in trouble such as getting a shock.

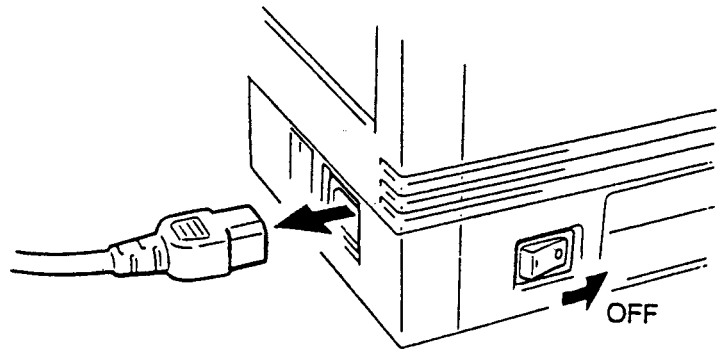


Fig. 5-97

WARNING:
- Be sure to use screwdrivers suitable for the respective screws. Otherwise the screws will be damaged.
- Replace parts and screws if damaged. Such parts may not only detract from the performance of the machine but also result in trouble.
- Remove the developer block, drum counter, and cleaning pad from the machine beforehand.
- Be sure to leave the removed drum (included in the developer block) and drum counter together.
- Note that exposing the drum surface directly to light will result in a drop in sensitivity of the drum (shorten its life). Wrap the removed drum unit with a soft cloth, etc.

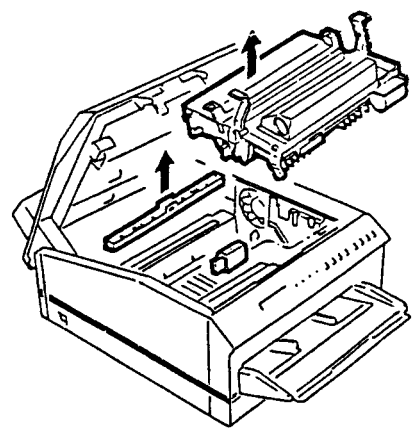


Fig. 5-98

Removal

Note: When mounting the side frame right block, adjustment of the mounting position of the cassette feed solenoid is required.

(1) Remove the main controller. (Refer to 3.2.1, "Main controller.")
(2) Remove the operation panel. (Refer to 3.1.1, "Operation panel.")
(3) Remove the top cover. (Refer to 3.1.2, "Top cover.")
(4) Remove the upper covers. (Refer to 3.1.3, "Upper covers.")
(5) Remove the mechanical controller. (Refer to 3.2.2, "Mechanical controller.")
(6) Remove the cassette feed solenoid. (Refer to 3.4.3, "Cassette feed solenoid.")
(7) Remove the front frame. (Refer to 3.4.4, "Front frame.")
(8) Remove the cassette feed roller. (Refer to 3.4.6, "Cassette feed roller.")
(9) Remove the paper feed roller. (Refer to 3.4.7, "Paper feed roller.")
(10) Remove the three set screws of the side frame right block and the one set screw of the gear plate, and remove the side frame right block.

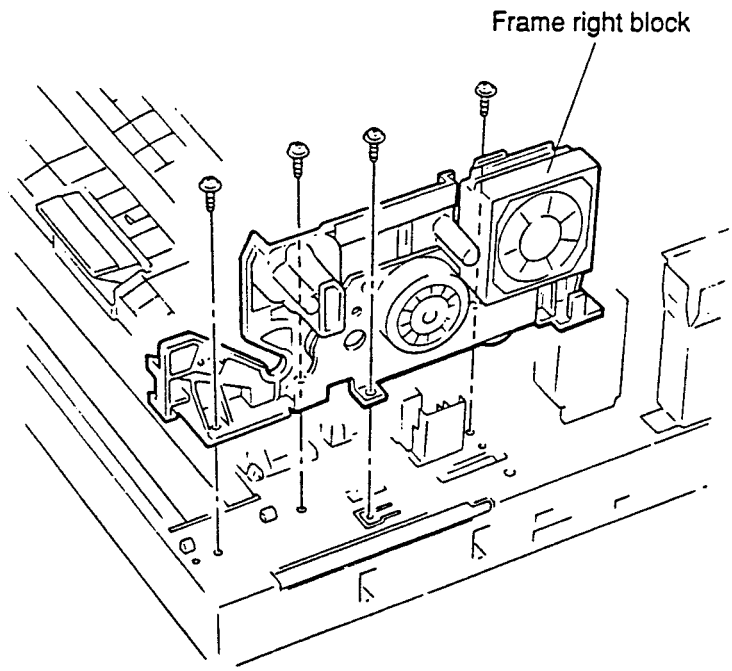


Fig. 5-99

Installation

(1) Attach the side frame right block to the base plate and tighten the three set screws.
(2) Mount the paper feed roller. (Refer to 3.4.7, "Paper feed roller.")
(3) Mount the cassette feed roller. (Refer to 3.4.6, "Cassette feed roller.")
(4) Mount the front frame. (Refer to 3.4.4, "Front frame.")
(5) Mount the cassette feed solenoid. (Refer to 3.4.3, "Cassettefeed solenoid.") By referring to 4-1, adjust the mounting position of the cassette feed solenoid.
(6) Mount the mechanical controller. (Refer to 3.2.2, "Mechanical controller.")
(7) Mount the upper covers. (Refer to 3.1.3, "Upper covers.")
(8) Mount the top cover. (Refer to 3.1.2, "Top cover.")
(9) Mount the operation panel. (Refer to 3.1.1, "Operation panel.")
(10) Mount the main controller. (Refer to 3.2.1, "Main controller.")

3.4.14 Feed gears

CAUTION: Before disassembling or reassembling any part, be sure to turn the power OFF and disconnect the power cord. Disassembling or reassembling with the power ON may result in trouble such as getting a shock.

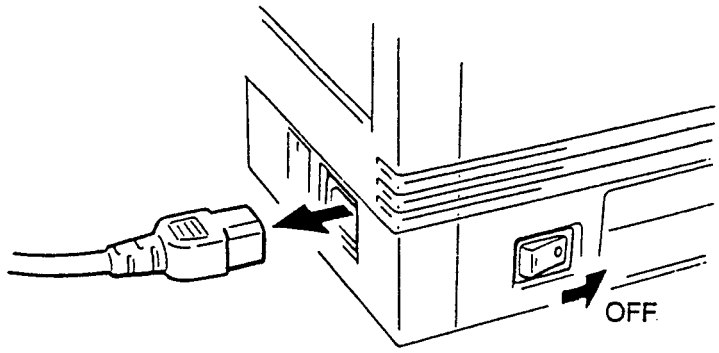


Fig. 5-100

WARNING:
- Be sure to use screwdrivers suitable for the respective screws. Otherwise the screws will be damaged.
- Replace parts and screws if damaged. Such parts may not only detract from the performance of the machine but also result in trouble.
- Remove the developer block, drum counter, and cleaning pad from the machine beforehand.
- Be sure to leave the removed drum (included in the developer block) and drum counter together.
- Note that exposing the drum surface directly to light will result in a drop in sensitivity of the drum (shorten its life). Wrap the removed drum unit with a soft cloth, etc.

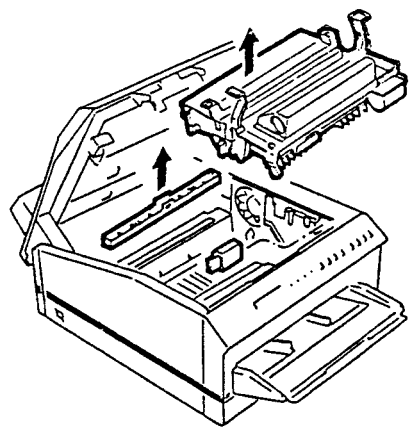


Fig. 5-101

Removal

Note: When mounting the feed gears, adjustment of the mounting position of the cassette feed solenoid is required. The gears are not secured. When removing the plate, be careful not to drop the gears.

(1) Remove the main controller. (Refer to 3.2.1, "Main controller.")
(2) Remove the operation panel. (Refer to 3.1.1, "Operation panel.")
(3) Remove the top cover. (Refer to 3.1.2, "Top cover.")
(4) Remove the upper covers. (Refer to 3.1.3, "Upper covers.")
(5) Remove the mechanical controller. (Refer to 3.2.2, "Mechanical controller.")
(6) Remove the cassette feed solenoid. (Refer to 3.4.3, "Cassette feed solenoid.")
(7) Remove the front frame. (Refer to 3.4.4, "Front frame.")
(8) Remove the cassette feed roller. (Refer to 3.4.6, "Cassette feed roller.")
(9) Remove the paper feed roller. (Refer to 3.4.7, "Paper feed roller.")
(10) Remove the side frame right block. (Refer to 3.4.13, "Side frame right block.")
(11) With the side frame side up, remove the three set screws of the gear plate and remove the gear plate.
(12) Remove the gears on the gear plate.

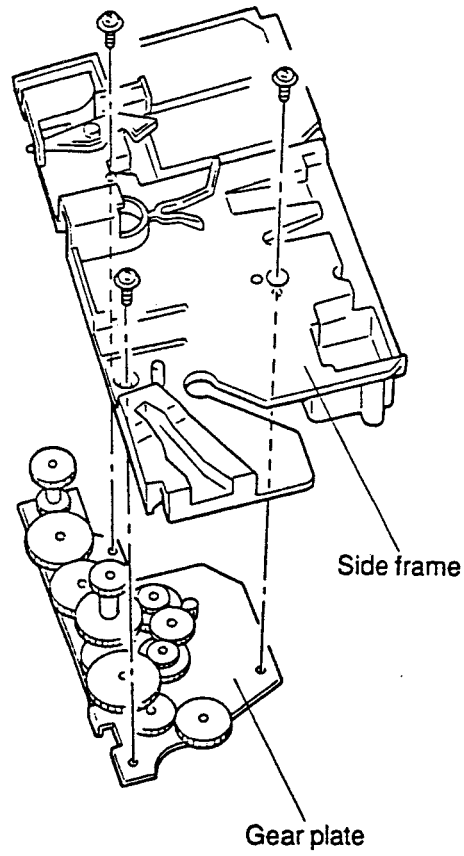


Fig. 5-102

Installation

(1) Mount the gears on the gear plate.
(2) Attach the gear plate to the side frame and tighten the three set screws.
(3) Mount the side frame right block. (Refer to 3.4.13, "Side fram eright block.")
(4) Mount the paper feed roller. (Refer to 3.4.7, "Paper feed roller.")
(5) Mount the cassette feed roller. (Refer to 3.4.6, "Cassette feed roller.")
(6) Mount the front frame. (Refer to 3.4.4, "Front frame.")
(7) Mount the cassette feed solenoid. (Refer to 3.4.3, "Cassettefeed solenoid.") By referring to 4-1, adjust the mounting position of the cassette feed solenoid.
(8) Mount the mechanical controller. (Refer to 3.2.2, "Mechanical controller.")
(9) Mount the upper covers. (Refer to 3.1.3, "Upper covers.")
(10) Mount the top cover. (Refer to 3.1.2, "Top cover.")
(11) Mount the operation panel. (Refer to 3.1.1, "Operation panel.")
(12) Mount the main controller. (Refer to 3.2.1, "Main controller.")

3.4.15 Heater unit

CAUTION: Before disassembling or reassembling any part, be sure to turn the power OFF and disconnect the power cord. Disassembling or reassembling with the power ON may result in trouble such as getting a shock.

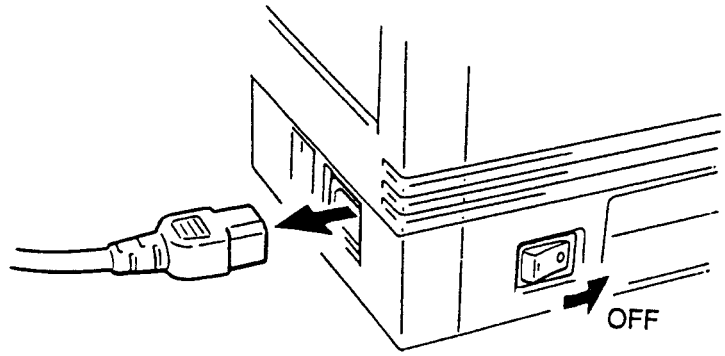


Fig. 5-103

WARNING:
- Be sure to use screwdrivers suitable for the respective screws. Otherwise the screws will be damaged.
- Replace parts and screws if damaged. Such parts may not only detract from the performance of the machine but also result in trouble.
- Remove the developer block, drum counter, and cleaning pad from the machine beforehand.
- Be sure to leave the removed drum (included in the developer block) and drum counter together.
- Note that exposing the drum surface directly to light will result in a drop in sensitivity of the drum (shorten its life). Wrap the removed drum unit with a soft cloth, etc.

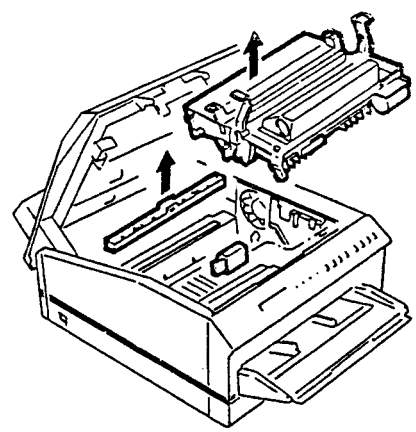


Fig. 5-104

Removal

WARNING: The heater unit has a temperature of as high as 160 to 180°C while in operation. Before touching the heater unit, turn the power OFF and then wait for 15 minutes.

(1) Remove the main controller. (Refer to 3.2.1, "Main controller.")
(2) Remove the operation panel. (Refer to 3.1.1, "Operation panel.")
(3) Remove the top cover. (Refer to 3.1.2, "Top cover.")
(4) Remove the upper covers. (Refer to 3.1.3, "Upper covers.")
(5) Detach the connector from CN12 on the mechanical controller.
(6) Detach the heater harness connector from on the power supply unit.

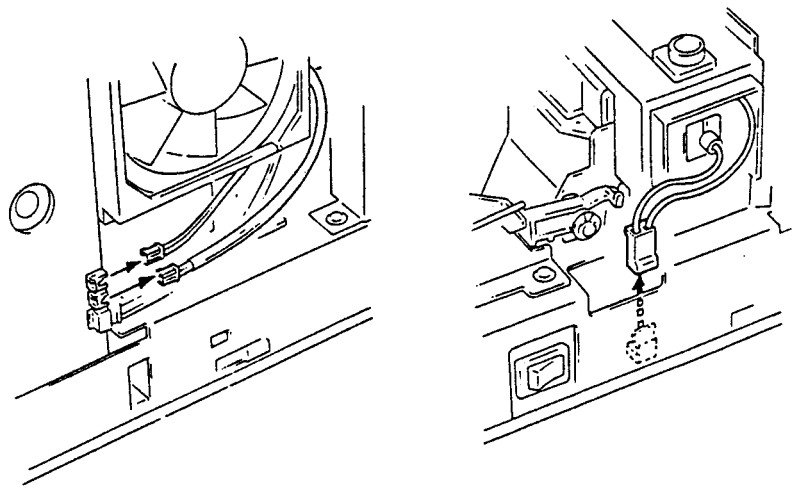


Fig. 5-105

(7) Remove the four set screws of the heater unit and remove the heater unit.

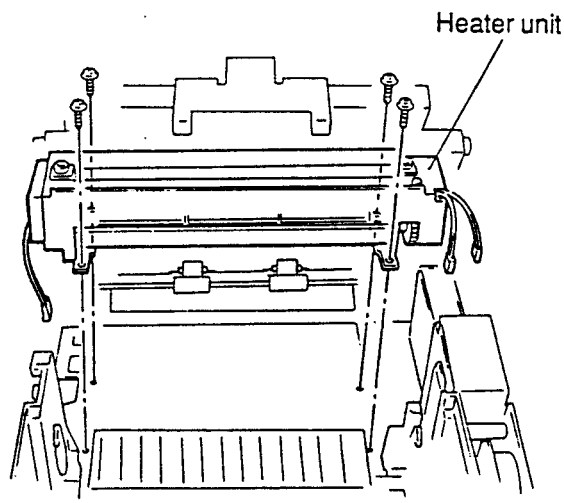


Fig. 5-106

Installation

(1) Mount the heater unit and tighten the four set screws.
(2) Attach the heater harness connector to on the power supply unit.
(3) Attach the connector to CN12 on the mechanical controller.
(4) Mount the upper covers. (Refer to 3.1.3, "Upper covers.")
(5) Mount the top cover. (Refer to 3.1.2, "Top cover.")
(6) Mount the operation panel. (Refer to 3.1.1, "Operation panel.")
(7) Mount the main controller. (Refer to 3.2.1, "Main controller.")

4. Adjustment

4.1 Adjusting the cassette feed solenoid gap

This adjustment must always be performed when the cassette feed solenoid armature or cassette feed solenoid is removed.

CAUTION:
- Before adjusting, be sure to turn the power OFF and disconnect the power cord.
- Adjusting with the power ON may result in trouble such as getting a shock.

WARNING:
- Be sure to use screwdrivers suitable for the respective screws. Otherwise the screws will be damaged.
- Replace parts and screws if damaged. Such parts may not only detract from the performance of the machine but also result in trouble.
- Remove the developer block, drum counter, and cleaning pad from the machine beforehand. Be sure to leave the removed drum unit (included in the developer block) and drum counter together.
- Note that exposing the drum surface directly to light will result in a drop in sensitivity of the drum (shorten its life). Wrap the removed drum unit with a soft cloth, etc.

Tools Required: Thickness gauge
Precision driver (2.4mm)

Adjusting Procedure

(1) Remove the developer block, cleaning pad, and drum counter from the printer.
(2) Remove the operation panel. (Refer to 3.1.1, "Operation panel.")
(3) Remove the top cover. (Refer to 3.1.2, "Top cover.")
(4) Remove the upper covers. (Refer to 3.1.3, "Upper covers.")
(5) Remove the mechanical controller. (Refer to 3.2.2, "Mechanical controller.")
(6) With the friction plate down, turn the cassette feed roller until the claw of the clutch spring touches the armature of the cassette feed solenoid.
(7) Loosen the set screws (2 pcs.) of the cassette feed solenoid, horizontally insert the 0.75mm thickness gauge between the clutch spring claw and the armature. Then tighten the set screws (2 pcs.) of the cassette feed solenoid.

(8) Turn the cassette feed roller until the claw of the clutch spring touches the armature again. Check that the gap between the clutch spring claw and the armature is 0.5 to 1.0mm when the armature is attracted by the cassette feed solenoid.

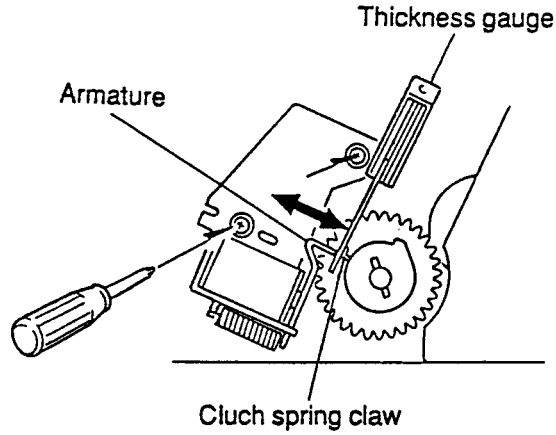


Fig. 5-107

(9) Then, with the clutch spring claw touching the armature, check that the gap between the cassette feed stopper hook and the armature is 1.5 to 2.5mm, using the thickness gauge.
(10) If the gap between the cassette feed stopper hook and the armature is not the specified value, loosen the set screws (2 pcs.) of the cassette feed stopper and adjust the position of the cassette feed stopper.

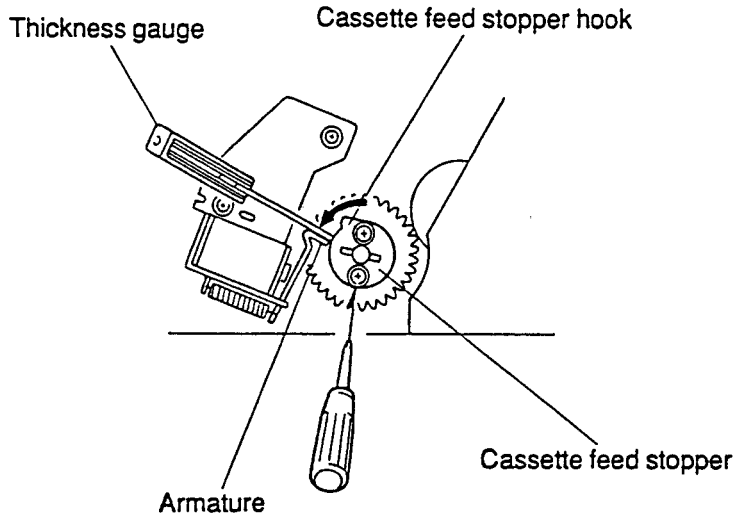


Fig. 5-108

(11) Mount the mechanical controller. (Refer to 3.2.2, "Mechanical controller.")
(12) Mount the upper covers. (Refer to 3.1.3, "Upper covers.")
(13) Mount the top cover. (Refer to 3.1.2, "Top cover.")
(14) Mount the operation panel. (Refer to 3.1.1, "Operation panel.")
(15) Install the developer unit, cleaning pad, and drum counter in the printer.

4.2 Adjusting the heat roller temperature

This adjustment must always be performed when fixing fails or when the mechanical controller or heat roller unit is replaced.

CAUTION:
- Before adjusting, be sure to turn the power OFF and disconnect the power cord.
- Adjusting with the power ON may result in trouble such as getting a shock.
- When performing this adjustment, be extremely careful because the heat roller unit and its peripheral parts will be very hot.

WARNING:
- Replace parts and screws if damaged. Such parts may not only detract from the performance of the machine but also result in trouble.
- Remove the developer block, drum counter, and cleaning pad from the machine beforehand. Be sure to leave the removed drum unit (included in the developer block) and drum counter together.
- Note that exposing the drum surface directly to light will result in a drop in sensitivity of the drum (shorten its life). Wrap the removed drum unit with a soft cloth, etc.

Tools Required:
Thermal tester
Special tool A
Service drum counter (Black color)
Tweezer

Adjusting Procedure

(1) Remove the developer unit, cleaning pad, and drum counter from the printer.
(2) Turn on the cover open sensor using the tweezer.

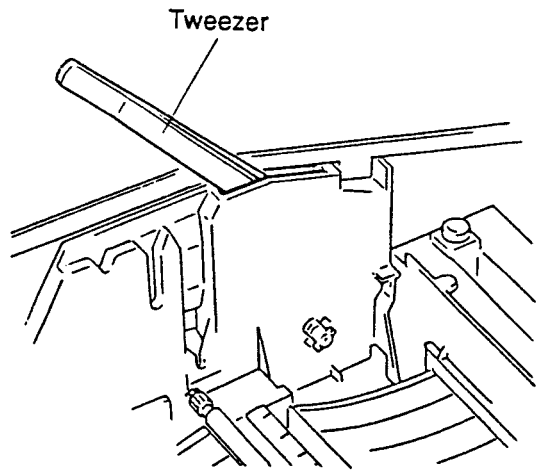
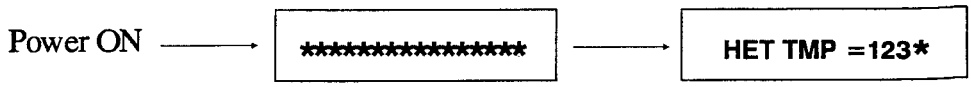


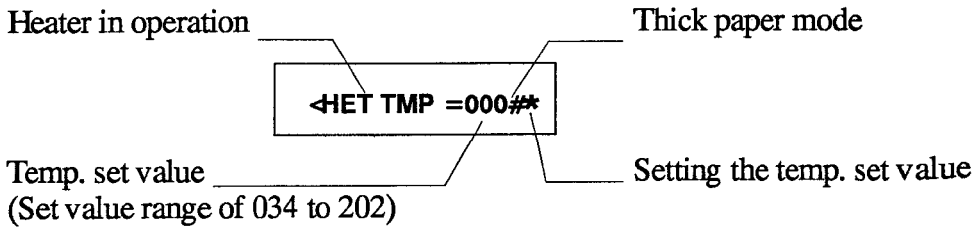
Fig. 5-109

(3) Mount the service drum counter . Turn the power ON while pressing the [UP] key.At this time, the LCD display will be as shown below:



* Set values differ with the printer.

The LCD display in this adjustment shows the printer status as shown below.



(4) Insert the thermal tester probe into special tool A, align the probe tip with the special tool A tip (part A in the figure), and tighten the set screw.

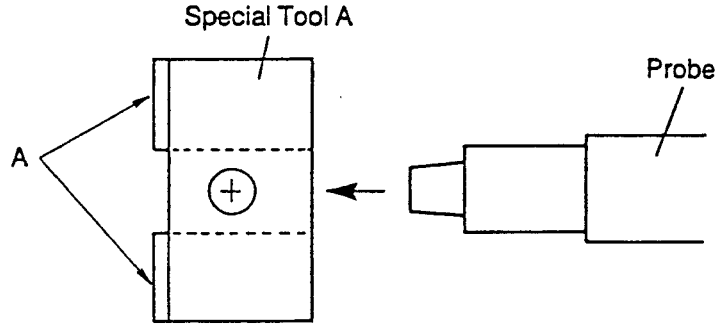


Fig. 5-110

WARNING: • Note that excessively tightening the probe set screw can break the probe.

(5) Turn on the thermal tester and set the reflectance in the following manner.

Procedure	Display
1) Turn the power ON.	1.00E 24.5°C (Displays measured room temp.)
2) Turn the [MODE] key once	1.00E
3) Set the reflectance to 0.89, using the [EMISSIVITY] key.	0.89E
4) Press the [MODE] key four times to place the tester in test mode.	24.5°C ("°C blinks)

Note: • Clean the lens inside the probe of thermal tester using a cotton swab with alcohol periodically. An unclean lens may not guarantee the correct measurement.

(6) Mount the thermal tester with special tool A in the center of the heat roller unit top by aligning it with the slot in the heat roller unit.

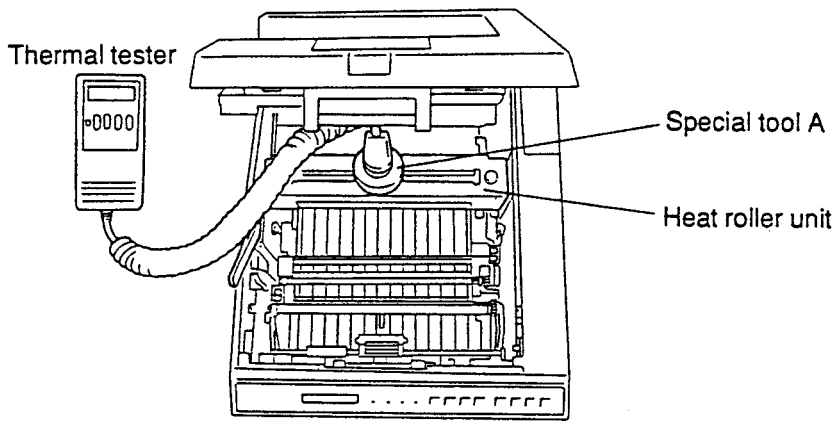


Fig. 5-111

(7) When the [DOWN] key is pressed once, the printer will turn the heater ON and drive the main motor. In this state, perform aging about five ~seven minutes. At this time, "≤" appears at the leftmost position on the LCD.

(8) Using the [FUNCTION] key and [UP] key (see the table below), adjust the set value so that the maximum heater temperature will be 158 +/- 2.5°C. Then, press the [DOWN] key two times to stop the heaten and turn it on. Even if the set value is adjusted, the temperature will not change immediately. Therefore, after adjusting the set value, perform aging about one minute and then measure the maximum temperature.

No.	Key	Function
1	FUNCTION	Increases the set value.
2	UP	Decreases the set value.
3	DOWN	Increases the heater temperature and drives the main motor.
4	SET	Increases the heater temperature.
5	CONTINUE/RESET	Thick paper mode
6	FF	Unused
7	PRINT/FONT/TEST	Unused
8	ONLINE	Sets the set value.

* When item 3 or 4 is selected, "<" appears at the leftmost position on the LCD.
* When item 5 is selected, "#" follows the set value on the LCD.
* When item 8 is set, "*" appears at the rightmost position on the LCD.

(9) After adjustment, press the [ONLINE] key to set the set value. At this time, "*" appears at the rightmost position on the LCD.

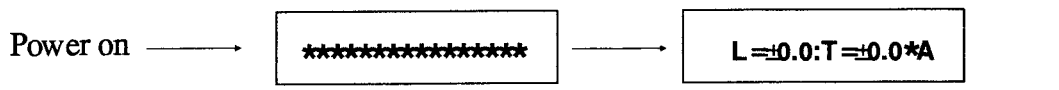
(10) Press the [DOWN] key to stop the heater. Then, turn the power OFF. Replace the service drum counter with the user drum counter. Install the developer block and cleaning pad in the printer.

4.3 Adjusting the left margin and Top Of Form

This adjustment must always be performed when one of the following laser unit, mechanical controller or each feed roller is removed.

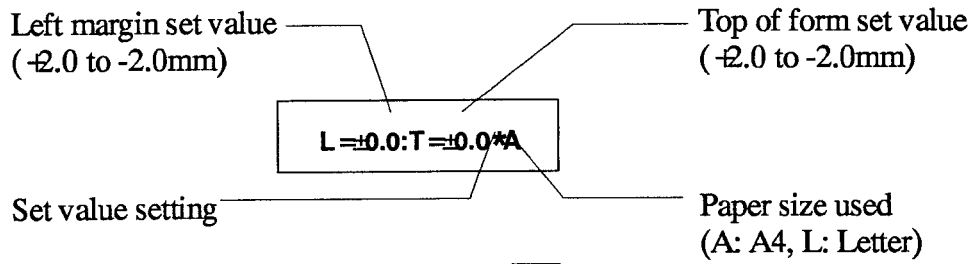
Tools Required: Service drum counter (Black color)
Ruler

(1) Mount the service drum counter in the printer. Turn power ON and press [FUNCTION] key on the panel. At this time, the LCD display will be as shown below.



* Set values vary with the printer.

In this adjustment, the LCD display shows the printer status as shown below.



(2) Set the paper size (A4, letter) using the [FF] key.
(3) Press the [CONTINUE/RESET] key to print the test pattern.
(4) Measure the left margin and top of form of the test pattern by using the ruler. Check that they are the specified values (both are 4.2mm) as shown below.

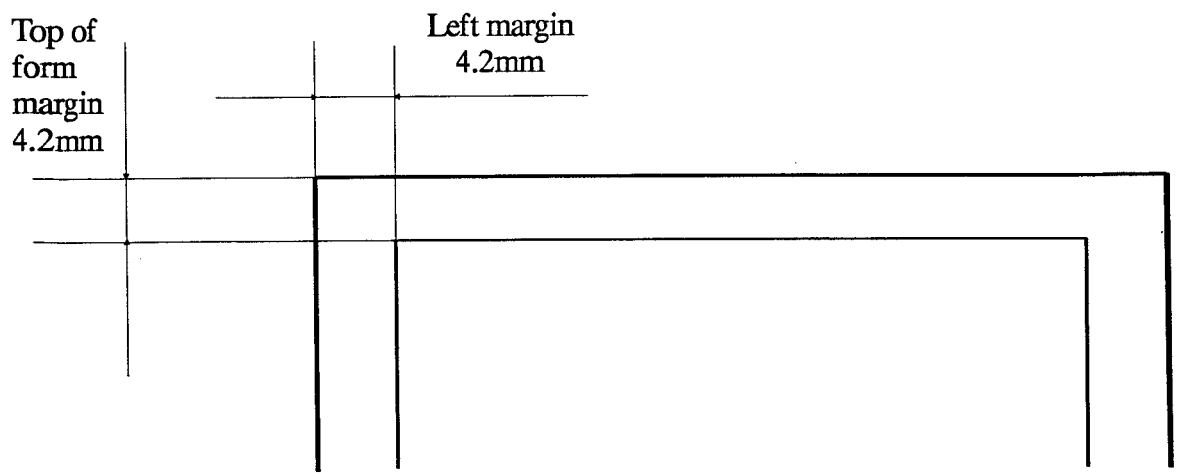


Fig. 5-112

(5) If the measured values are not the specified values, adjust set values using [FUNCTION], [UP], [DOWN], and [SET] keys (see below for the keys).

No.	Key	Function
1	FUNCTION	Increases the left margin set value.
2	UP	Decreases the left margin set value.
3	DOWN	Increases the top of form set value.
4	SET	Decreases the top of form set value.
5	CONTINUE/RESET	Prints the test pattern.
6	FF	Selects between paper sizes (A4, Letter).
7	PRINT/FONT/TEST	Unused
8	ONLINE	Sets the set value.

* The character displayed at the rightmost position on the LED varies depending on the item selected for item 6. (A: A4, L: Letter)
* When item 8 is set, "*" appears at the rightmost position on the LCD.

(6) After adjustment, press the [ONLINE] key to set the set value.At this time, "*" follows each set value on the LCD.

(7) Press the [CONTINUE/RESET] key again to print the test pattern and check with the ruler.

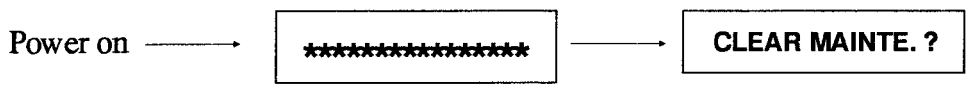
(8) Turn the power OFF and replace the service drum counter with the user drum counter.

4.4 Maintenance Clear

This operation must always be performed at the end of service maintenance after printing 80,000 sheets of paper ("MAINTENANCE" displayed on the LCD).

Tool Required: Service drum counter (Black color)

(1) Mount the service drum counter in the printer. Turn the power ON while pressing [FF] key. At this time, the display on the LCD will be as shown below.



(2) When the [FUNCTION] key is pressed in the above state, the printer will be cleared to the normal mode.

(3) Turn the power OFF and replace the service drum counter with the user drum counter.

5. Checking

The following items must always be checked when the printer is disassembled.

5.1 Checking the ground of the chargers

5.1.1 Transfer charger

Check the continuity between the transfer charger case and the frame.

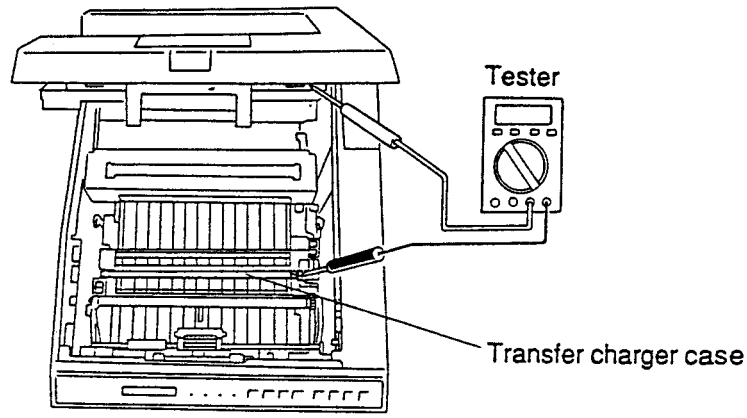


Fig. 5-113

5.1.2 Discharge charger

Check the continuity between the discharger case and the frame.

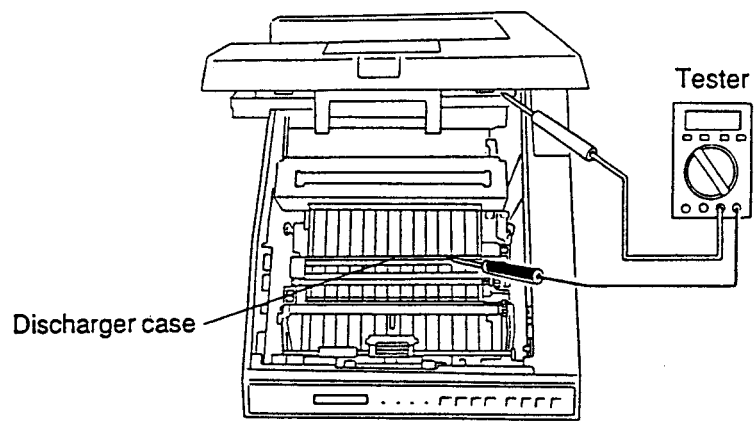


Fig. 5-114

5.2 Checking the ground of the rollers

5.2.1 Cassette feed roller

Check the continuity between the cassette feed roller shaft and the frame.

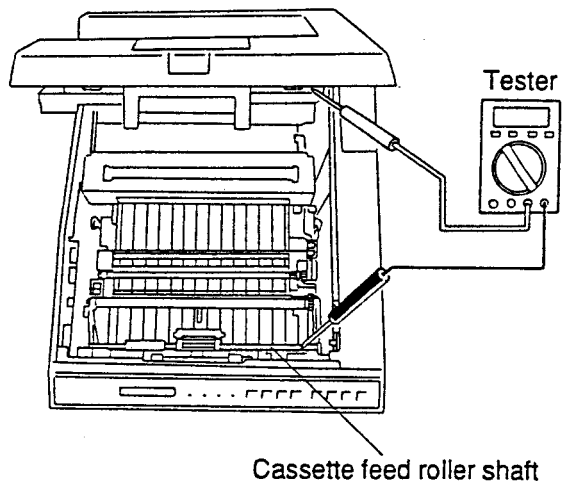


Fig. 5-115

5.2.2 Paper feed roller

Check the continuity between the paper feed roller shaft and the frame.

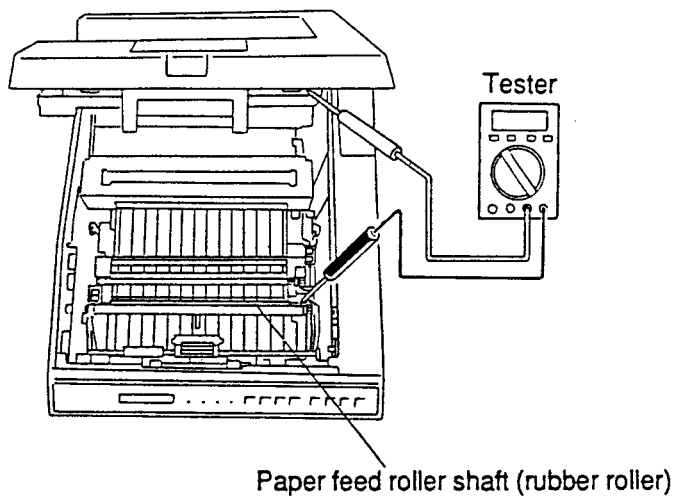


Fig. 5-116

5.3 Checking the ground of the drum shaft

Check the continuity between the drum shaft and the frame.

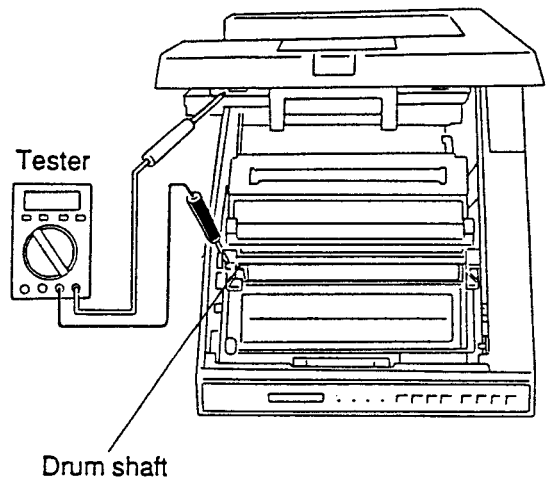


Fig. 5-117

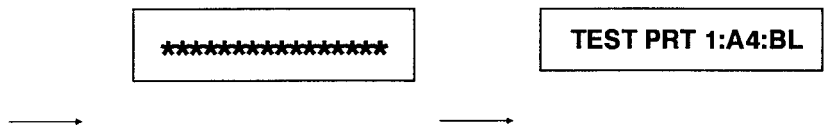
6. Test Print

Three kinds of test prints are available using the service drum counter. Select one of them depending on the service situation.

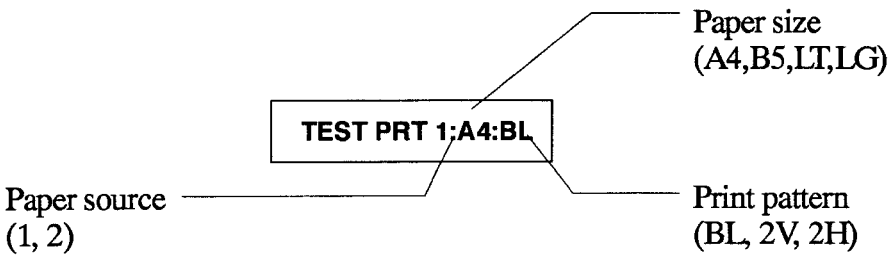
Tool Required : Service drum counter (Black color)

(1) Turn off the printer power and remove the drum counter from the printer.

(2) Mount service drum counter. Turn the power ON while pressing the [CONTINUE/RESET] key on the panel. At this time, the LCD display will be as shown below.



The LCD display indicates the following printer status.



(3) Using the [FUNCTION] key, select a print pattern.
BL: Solid
2V: 2 vertical dots
2H: 2 horizontal dots

(4) Using the [UP] key, select a paper size to be used.
A4: A4
B5: B5
LT: Letter
LG: Legal

(5) Using the [DOWN] key, select a paper source.
1: Paper cassette
2: 2nd bin feeder

(6) When the [CONTINUE/RESET] key is pressed, the printer prints and continues to print until the key is pressed again (max. 5 sheets of paper).

(7) After checking the print, turn the power OFF and replace the service drum counter with the user drum counter.

No.	Key	Function
1.	FUNCTION	Selects a print pattern.
2.	UP	Selects a paper size.
3.	DOWN	Selects a paper source.
4.	SET	Unused
5.	CONTINUE/RESET	Starts and stops printing.
6.	FF	Unused
7.	PRINT/FONT/TEST	Unused
8.	ONLINE	Unused

7. Lubrication

7.1 The mechanisms and parts which must not be lubricated are:

- Drum unit
- Optical unit
- Controller PCB
- Heat roller unit
- Feed rubber roller

* Also avoid lubricating the areas around the above mechanisms and parts.
* Should they be lubricated or oil run down into them, thoroughly remove oil with clean rags.

7.2 Notes on Lubrication

Before lubrication, thoroughly remove old oil, rust-preventing oil, dust, and other dirt with rags. Then apply a proper amount of oil. Oil should be applied to only the specified points.

7.3 Types of specified oils

Specified Oil	
Multipurpose No. 00 FLOIL GE-334C Silicon Grease G-501	

7.4 Containers and Lubrication Tools for specified oils

- Containers should be marked clearly. Use only the specified oils.
- Repeatedly apply a slight amount of oil. Avoid excessive lubrication.
- Use a brush when lubricating limited areas or areas dense with parts.
- Be sure to wipe off running down oil.

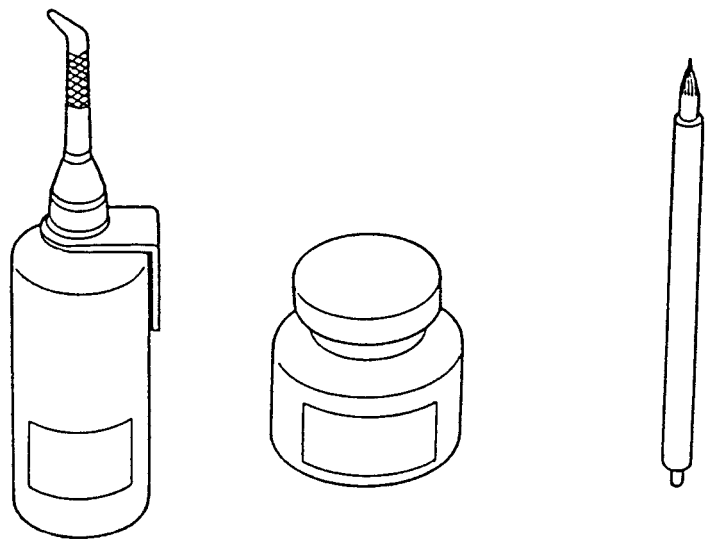
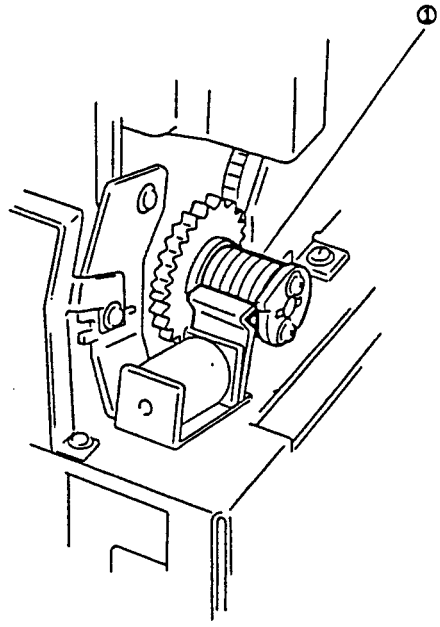


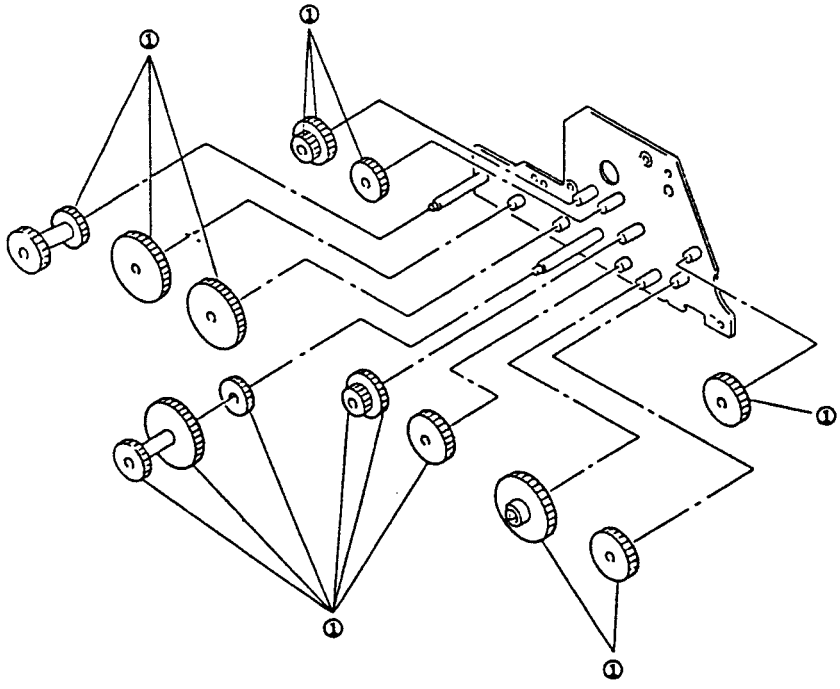
Fig. 5-118

7.5 Specified Lubrication Points



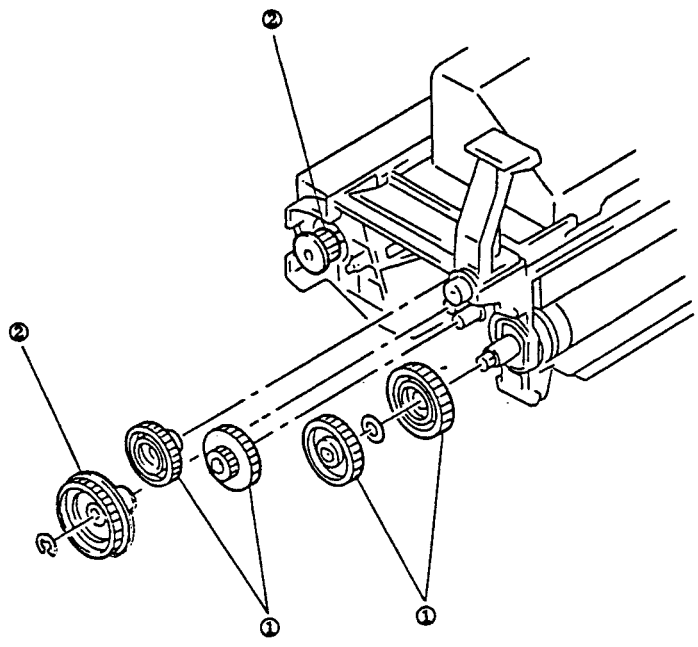
Cassette feed roller gear

① Multipurpose No. 00



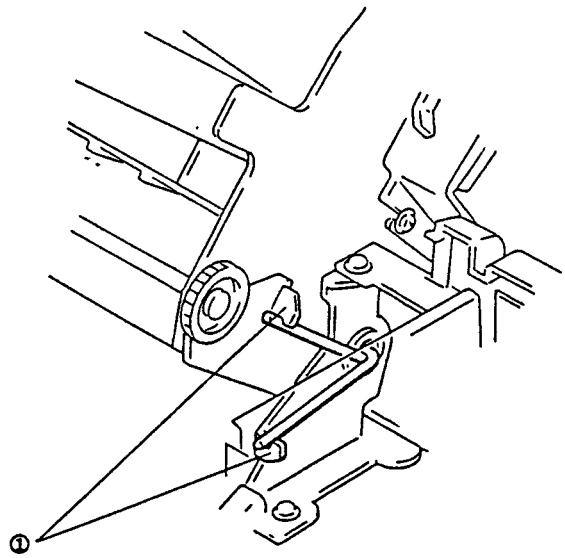
Side frame gear

① Silicon Grease G501



Developer unit

① Multipurpose No. 00
② Silicon Grease G501



Frame spring

① FLOIL GE-334C

8. Appendix

8.1 Tool list

(1) BASIC TOOLS

Tools	Q'ty
Philips Screwdriver (4mm)	1
Blade Screwdriver (3mm)	1
Philips Screwdriver (2.4mm)	1
Cutting Pliers	1
Tweezers	1
Thickness Gauge	1 Set
Multimeter (Digital)	1

(2) SPECIAL TOOLS

Tools	Q'ty
Special Tool A (Temperature)	1
Thermal Tester	1
Service drum counter	

NMS1474
CHAPTER:6- TROUBLESHOOTING

CONTENTS CHAPTER 6 : TROUBLE SHOOTING

1. Initialization Inspection 6-1

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1.2 Checking the charger 6-1

1.3 Checking the paper 6-1

1.4 Checking the consumable parts 6-1

1.5 Is the printer dirty inside? 6-2

1.6 Is there condensation inside the printer? 6-2

2. Basic trouble shooting procedure 6-3

3. Image malfunction countermeasure 6-4

1. Initialization Inspection

1.1 Settings

Check the items indicated below to make sure they are correct.

- Is the power supply 90 to 130V AC or 198 to 264V AC?
- Is the unit placed in a horizontal position?
- Is the ambient temperature 10 to 35°C (50 to 95°F)? Is the relative humidity 20% to 80%?
- Is the unit installed in a location where ammonia gas is generated, close to high temperatures or humidity (faucets, water heaters, or humidifiers) near heat sources or dusty areas?
- Is the printer situated in a location that is exposed to direct sunlight? (If it is exposed to direct sunlight use a curtain to shut out the light.)
- Is the place well ventilated?

1.2 Checking the charger

- Are the charger case or wires dirty?
- Are the charger wires positioned straight?
- Is the charger installed securely?
- Are the charger guide and guide roller damaged?

1.3 Checking the paper

- Does the paper conform to the recommended paper specifications (60 to 105 g/m2 (16 ~28lbs) for automatic feed and 60 to 120 g/m2 (16 ~32lbs) for manual feed).
- Is the paper absorbing moisture?

1.4 Checking the consumable parts

- Consult Chapter 2 and replace the necessary supplies.

1.5 Is the printer dirty inside?

- Consult Chapter 2 when cleaning is necessary and perform the necessary maintenance.

1.6 Is there condensation inside the printer?

Condensation is generated easily when the printer is used during the winter and can be the source of any of the following problems.

- The images that are output might be thin when there is condensation in the internal optical systems.
- The resistance of the optical conductivity increases if there is condensation in the photosensitive drum and irregularities may be produced in the printing.
- An electrical leak or short circuit may occur if there is condensation in the charger.
- A paper jam might occur if there is condensation in the paper guide.
- The friction decreases if there is condensation in the cassette feed roller and malfunctions in the paper supply may occur.

When there is condensation within the unit, allow each part to dry off for ten to twenty minutes before turning the power on.

Condensation can also occur if the consumable supply set (drum and toner set) are suddenly brought from a cold storage area into a warm room and opened quickly. This can also be a source of printing malfunctions, so only open the package after it has adjusted to the room temperature for an adequate amount of time (1 to 2 hours).

2. Basic Troubleshooting Procedures

Whenever printing malfunctioning or damage occurs, first perform the initial inspection. If the printer still does not function properly, determine the cause of the problem by performing the following procedures.

- When image problems occur:

  Search for the image that corresponds to the printed output in the section on image malfunction countermeasures and perform the applicable inspection procedures.

- When operation malfunctions occur:

  Perform the necessary repairs or replacements as described in the section on operation malfunction countermeasures.

- When paper delivery malfunctions such as paper jams or paper supply problems occur:

  Perform the necessary repairs or replacements according to the instructions in the section on delivery malfunction countermeasures.

Note: Be sure to turn the power switch to OFF when performing repairs because the area surrounding the heat roller becomes extremely hot during operation. Make sure that the area surrounding the heat roller has cooled off before attempting any repairs or adjustments.

Take care when turning off the cover open sensor and performing other repairs because it is possible that a high-voltage charge may still remain in the charger, drum unit and developer case.

3. Image Malfunction Countermeasures

Image malfunction sample chart

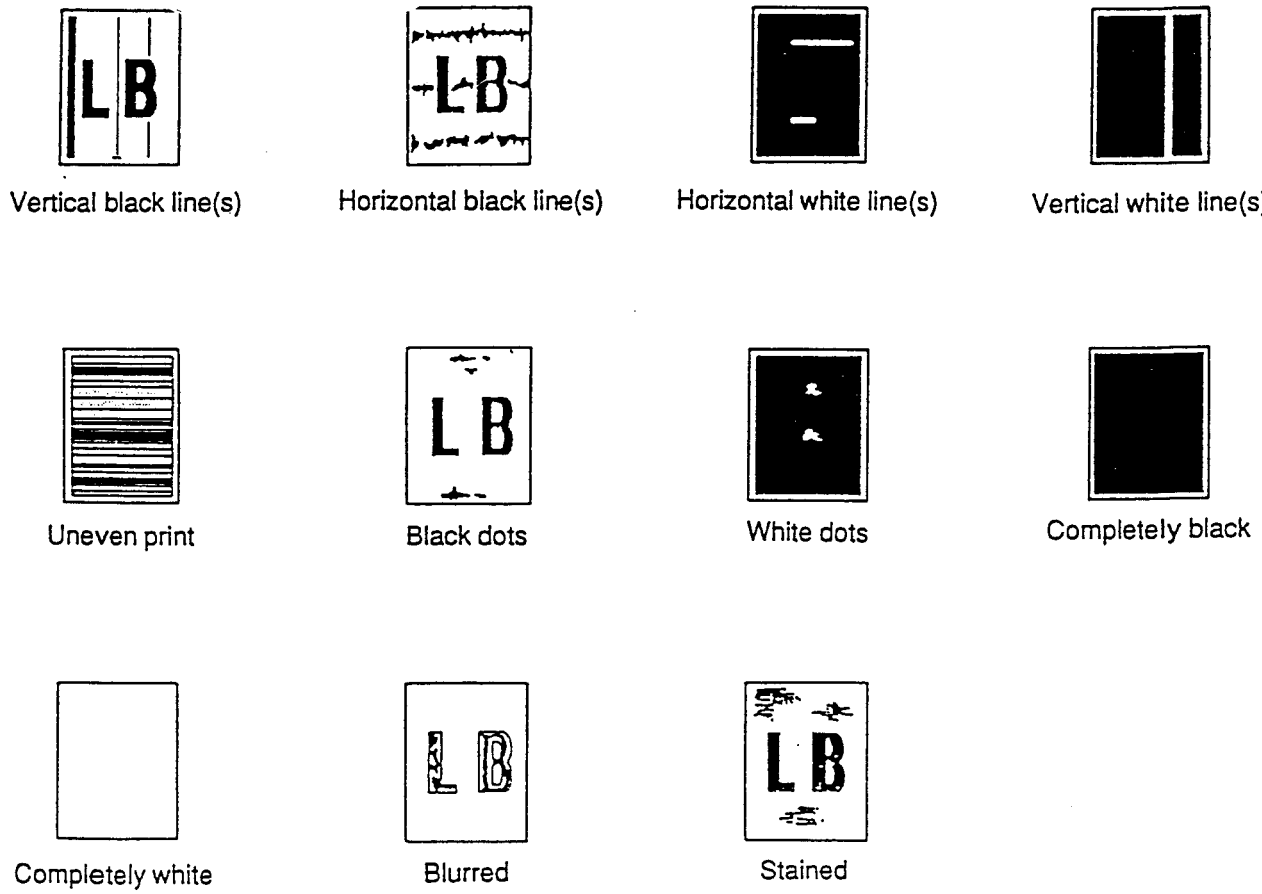
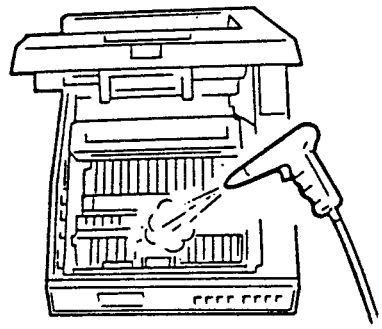
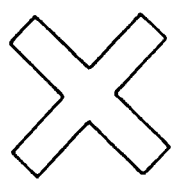
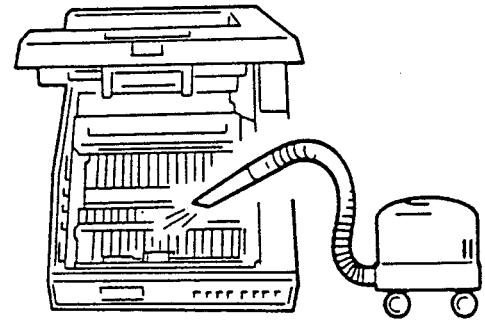


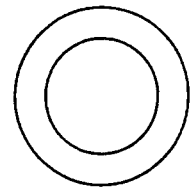
Fig. 6-1 Image malfunction sample chart

WARNING: Toner or dust in the printer should not be blown off by air.
Use a vacuum cleaner for cleaning.

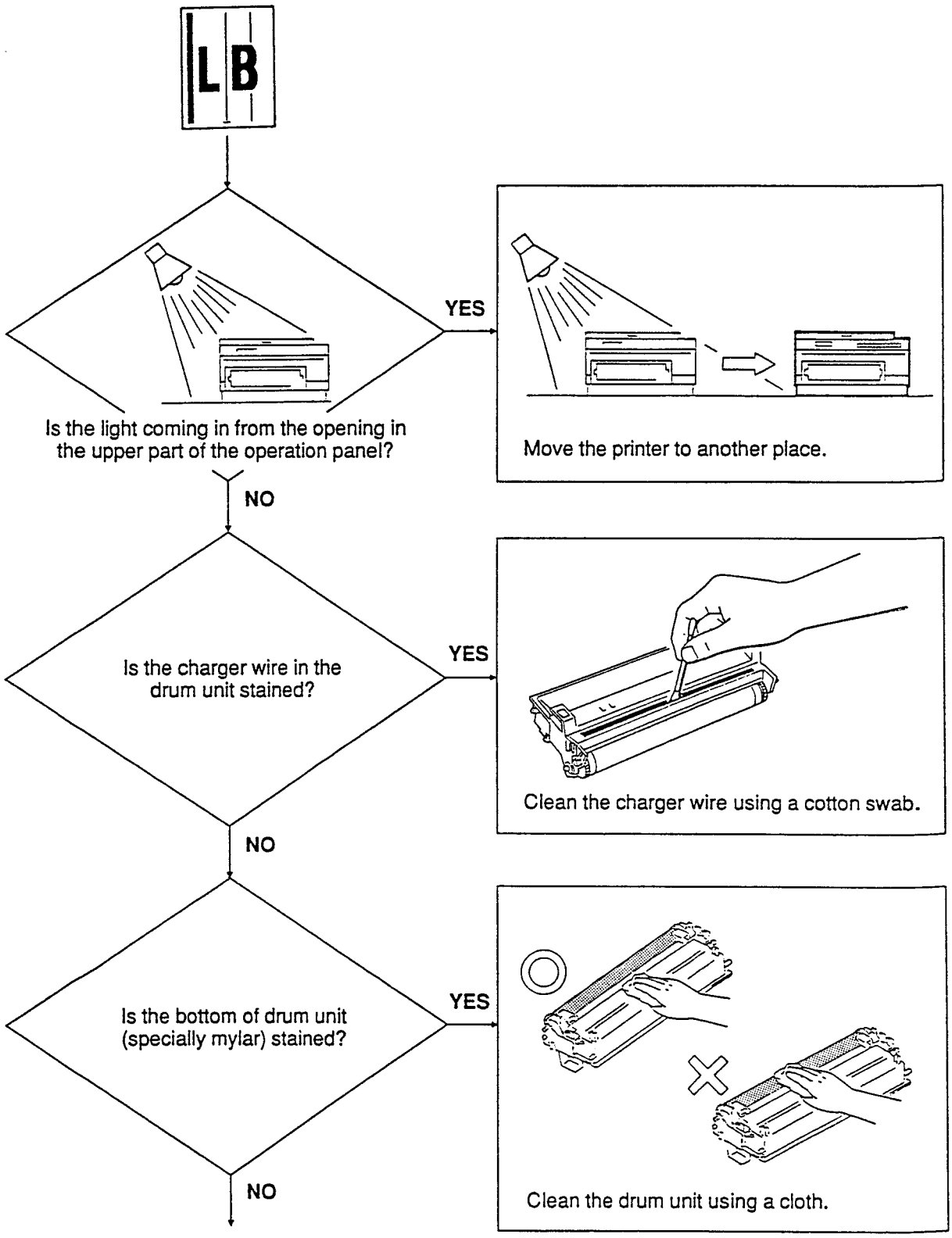






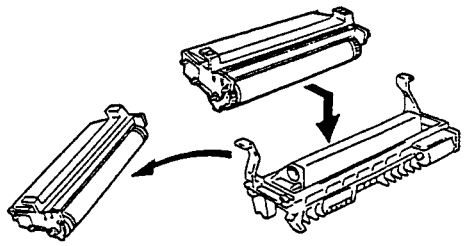


1. Vertical black line(s)


LB
Is the light coming in from the opening in the upper part of the operation panel?
YES
Move the printer to another place.
NO
Is the charger wire in the drum unit stained?
YES
Clean the charger wire using a cotton swab.
NO
Is the bottom of drum unit (specially mylar) stained?
YES
Clean the drum unit using a cloth.
NO

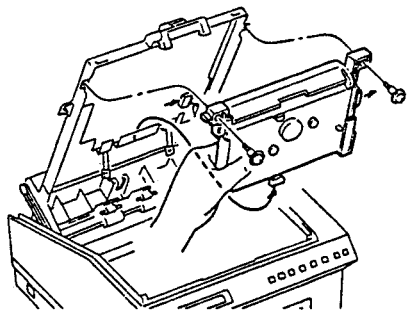
* Do not clean and touch the drum surface.

NO



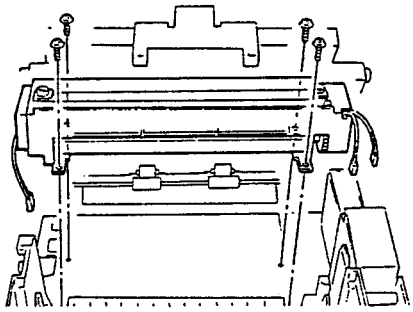
Replace the drum unit.

NO



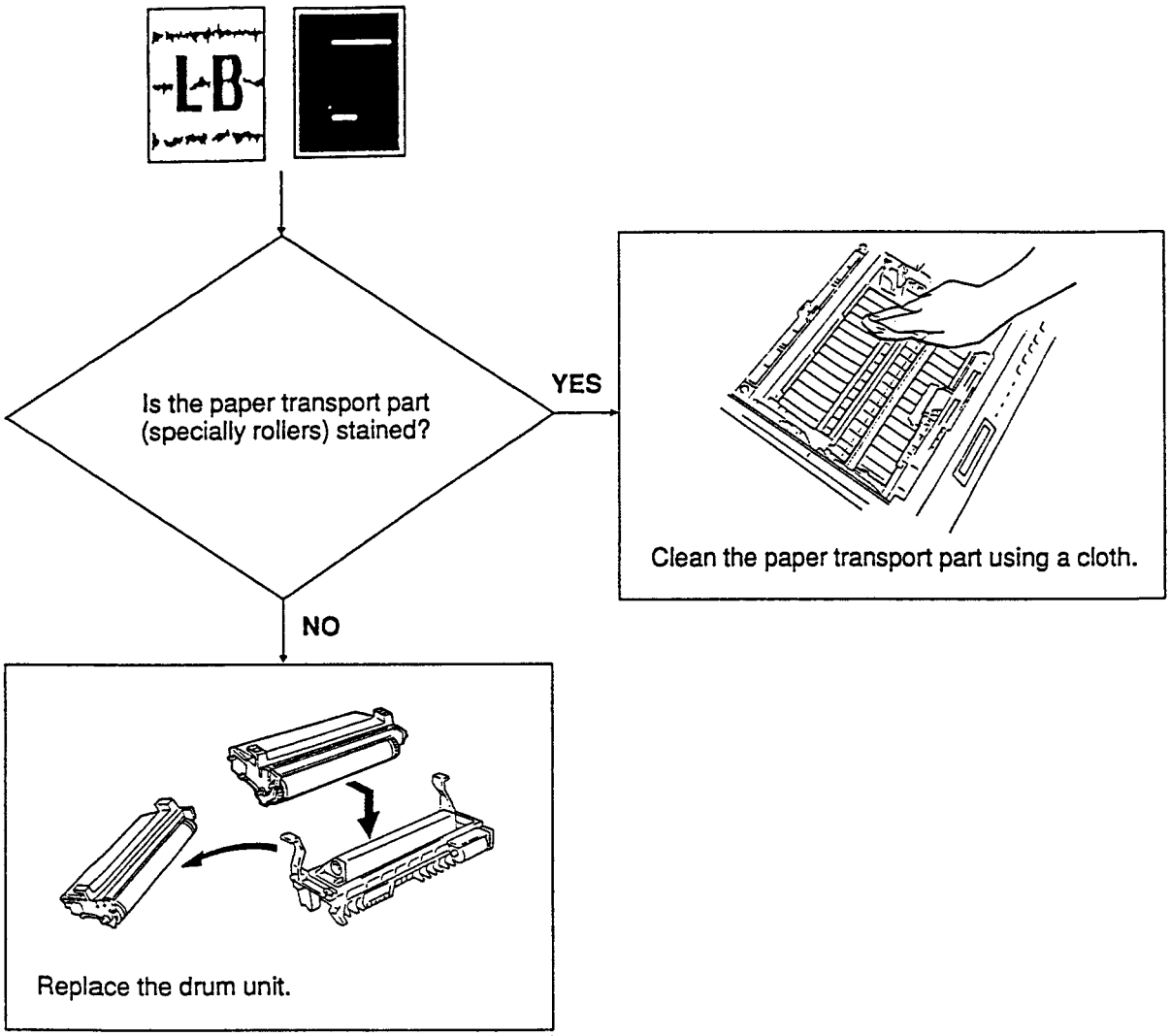
Replace the laser scanner unit.

NO

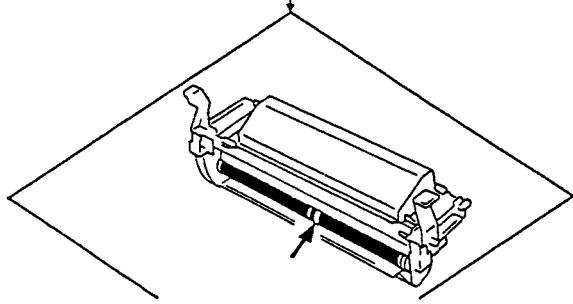


Replace the heat roller unit.

2. **Horizontal black line(s)/Horizontal white line(s)**

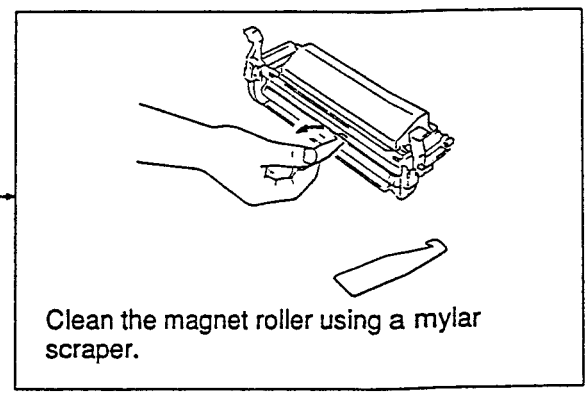

Is the paper transport part (specially rollers) stained?
YES
Clean the paper transport part using a cloth.
NO
Replace the drum unit.

3. Vertical white line(s)



Is the white line generated on the magnet roller of the developer unit?

YES

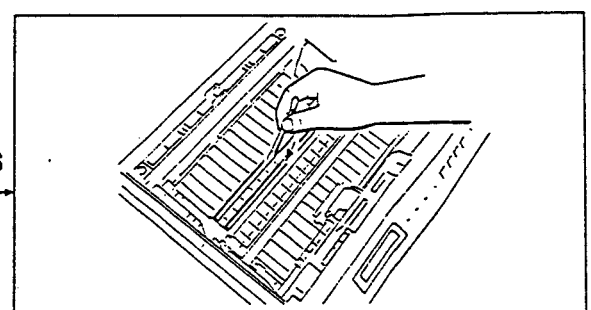


Clean the magnet roller using a mylar scraper.

NO

Is the transfer charger wire stained?

YES

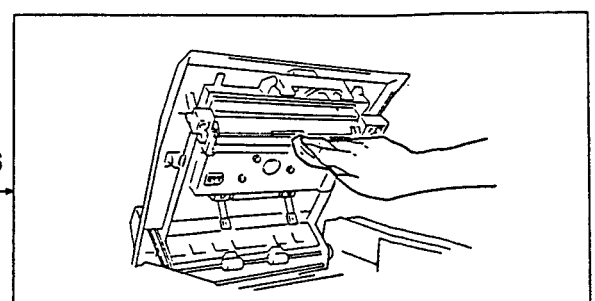


Clean the transfer charger wire using a cotton swab.

NO

Is the laser slit stained?

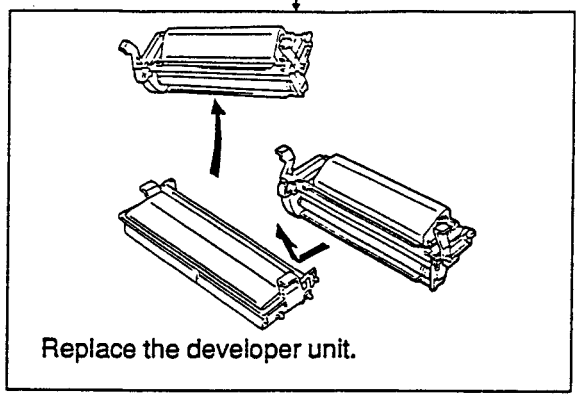
YES



Clean the laser slit using silbon paper and lens cleaner.

NO

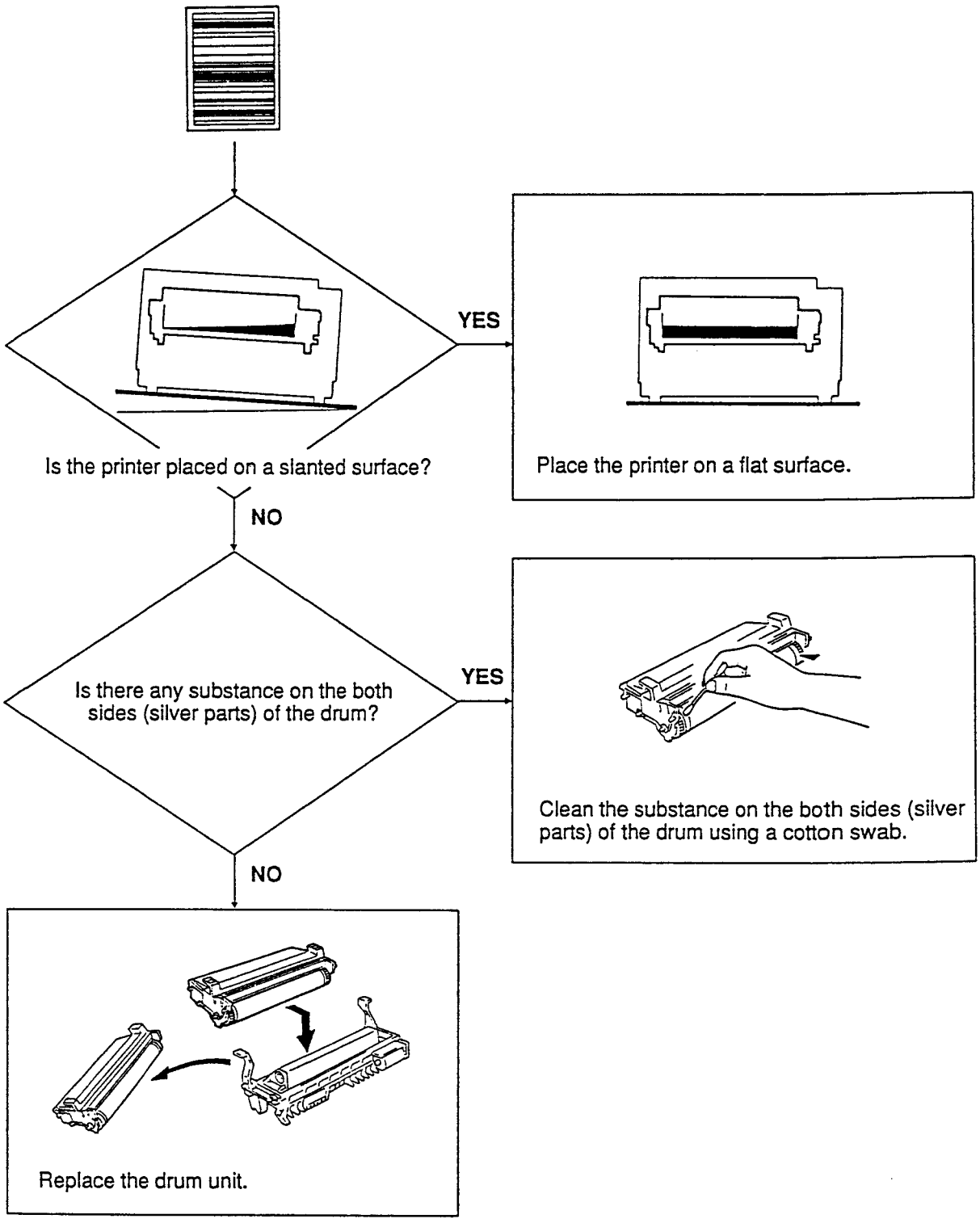
NO



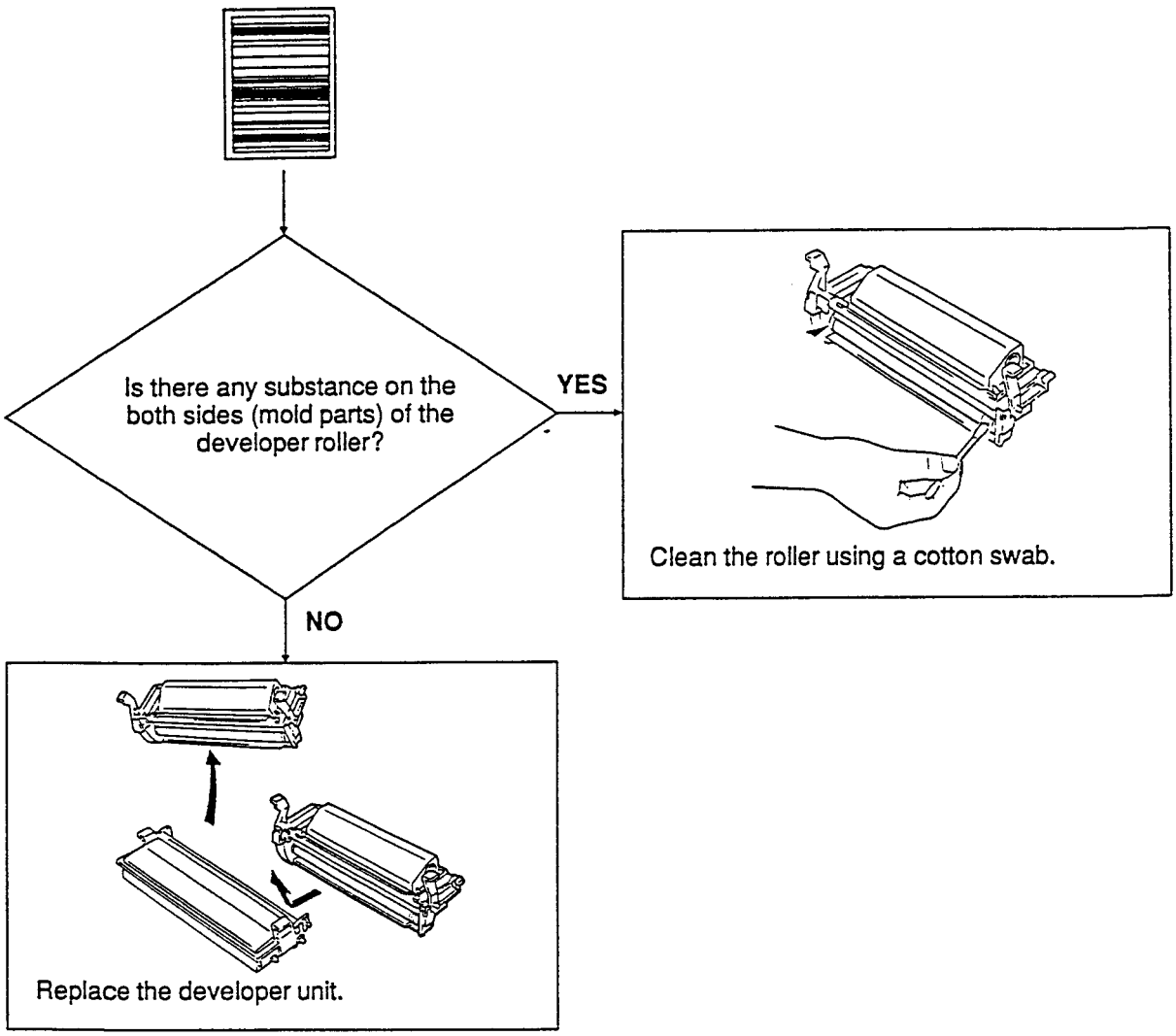
Replace the developer unit.

4. Uneven print

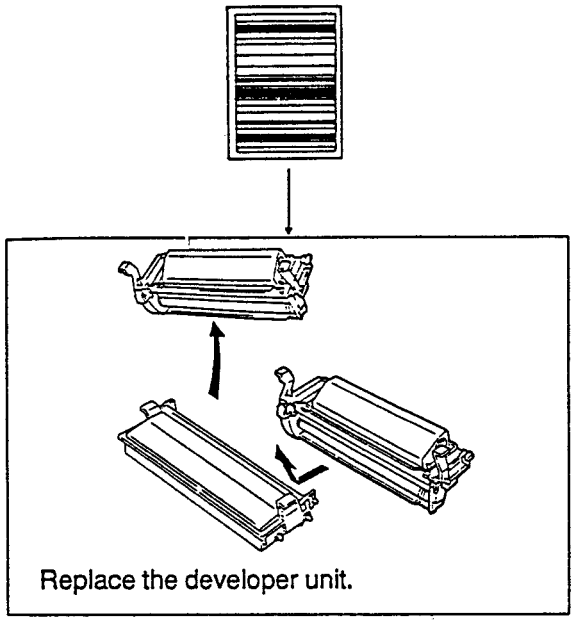
(1) 96mm (3.78 inches) pitch


YES
Is the printer placed on a slanted surface?
Place the printer on a flat surface.
NO
Is there any substance on the both sides (silver parts) of the drum?
YES
Clean the substance on the both sides (silver parts) of the drum using a cotton swab.
NO
Replace the drum unit.

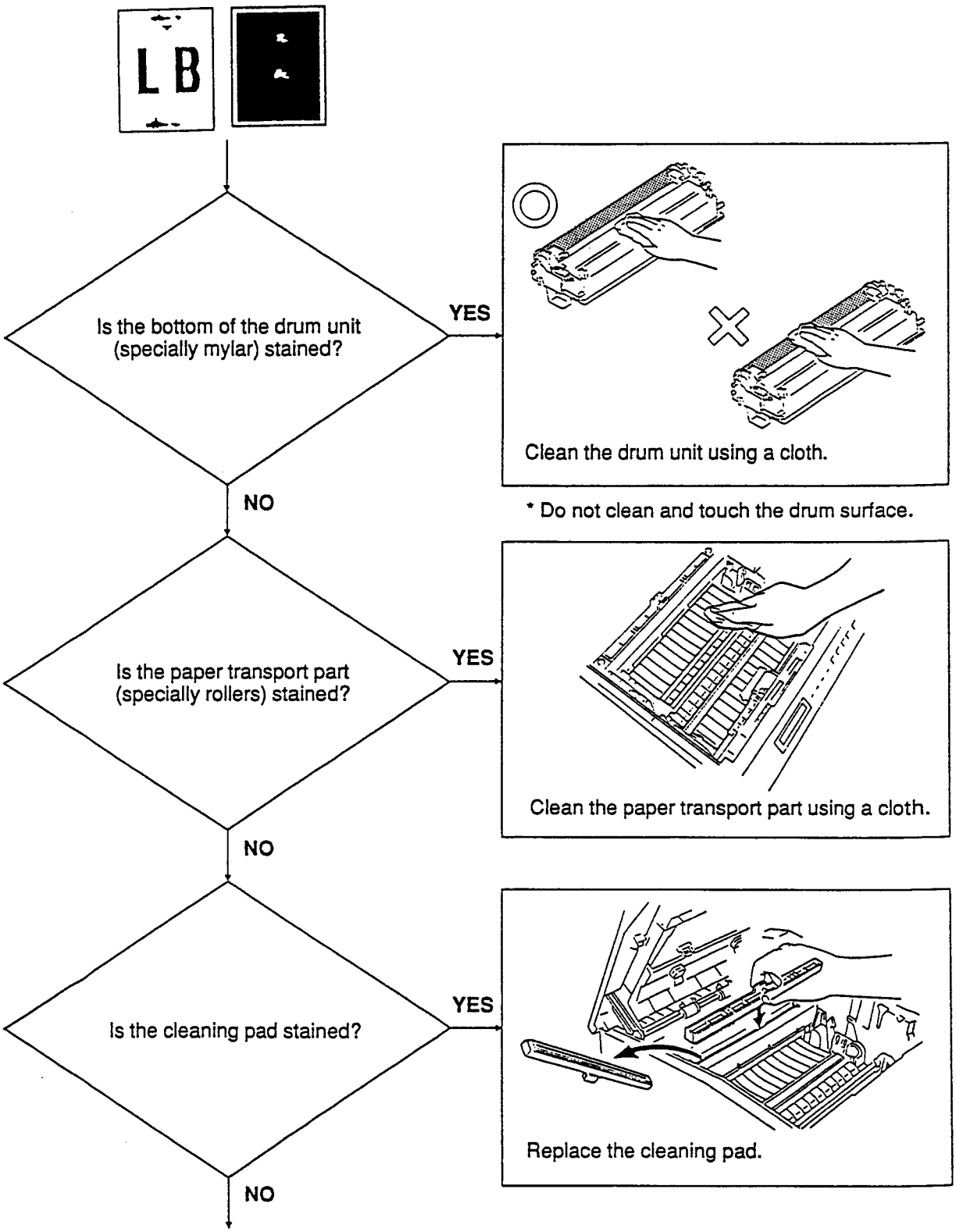
(2) 64mm (2.52 inches) pitch

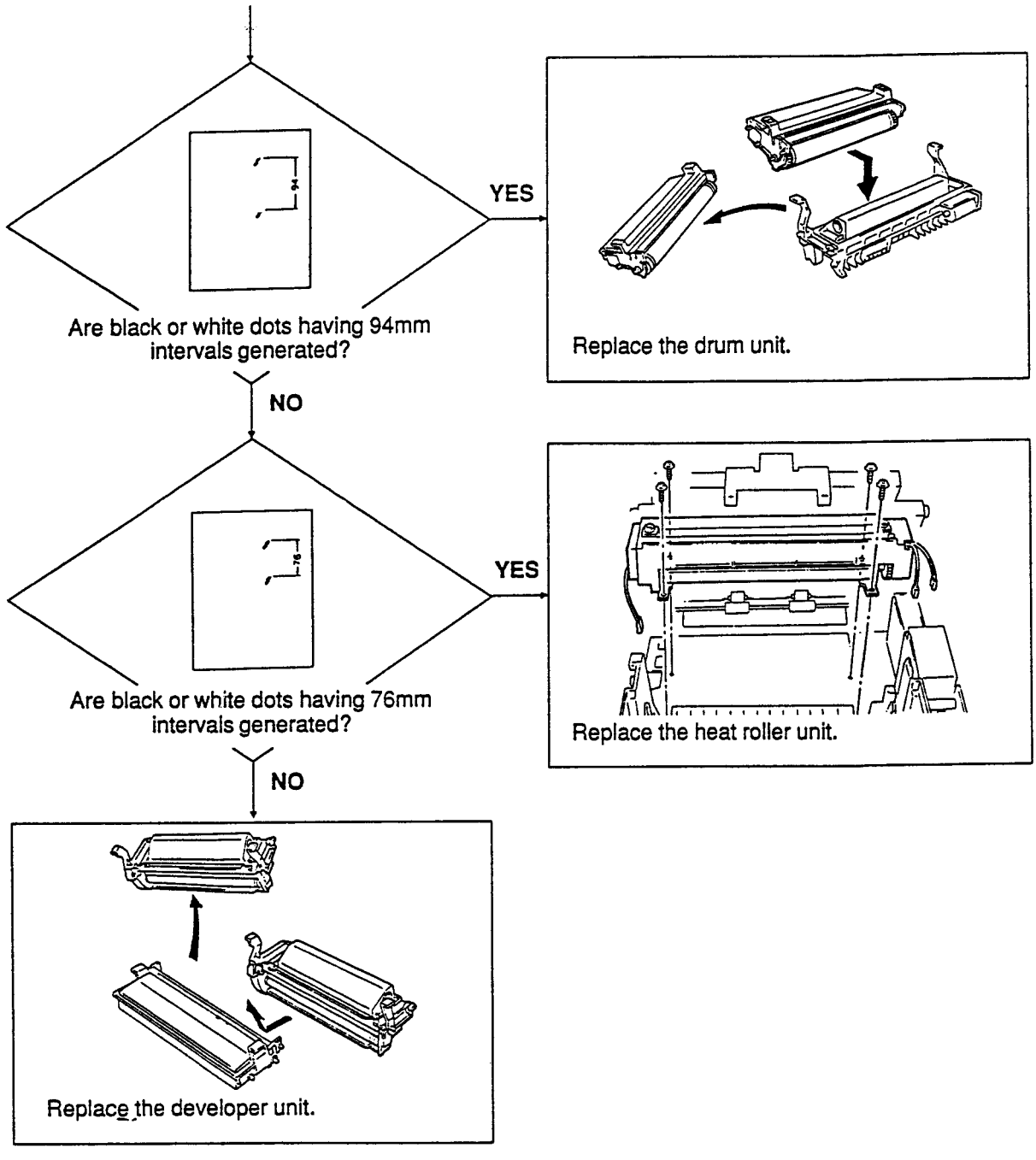

Is there any substance on the both sides (mold parts) of the developer roller?
YES
Clean the roller using a cotton swab.
NO
Replace the developer unit.

(3) 13-16mm (0.51 to 0.63 inches) pitch

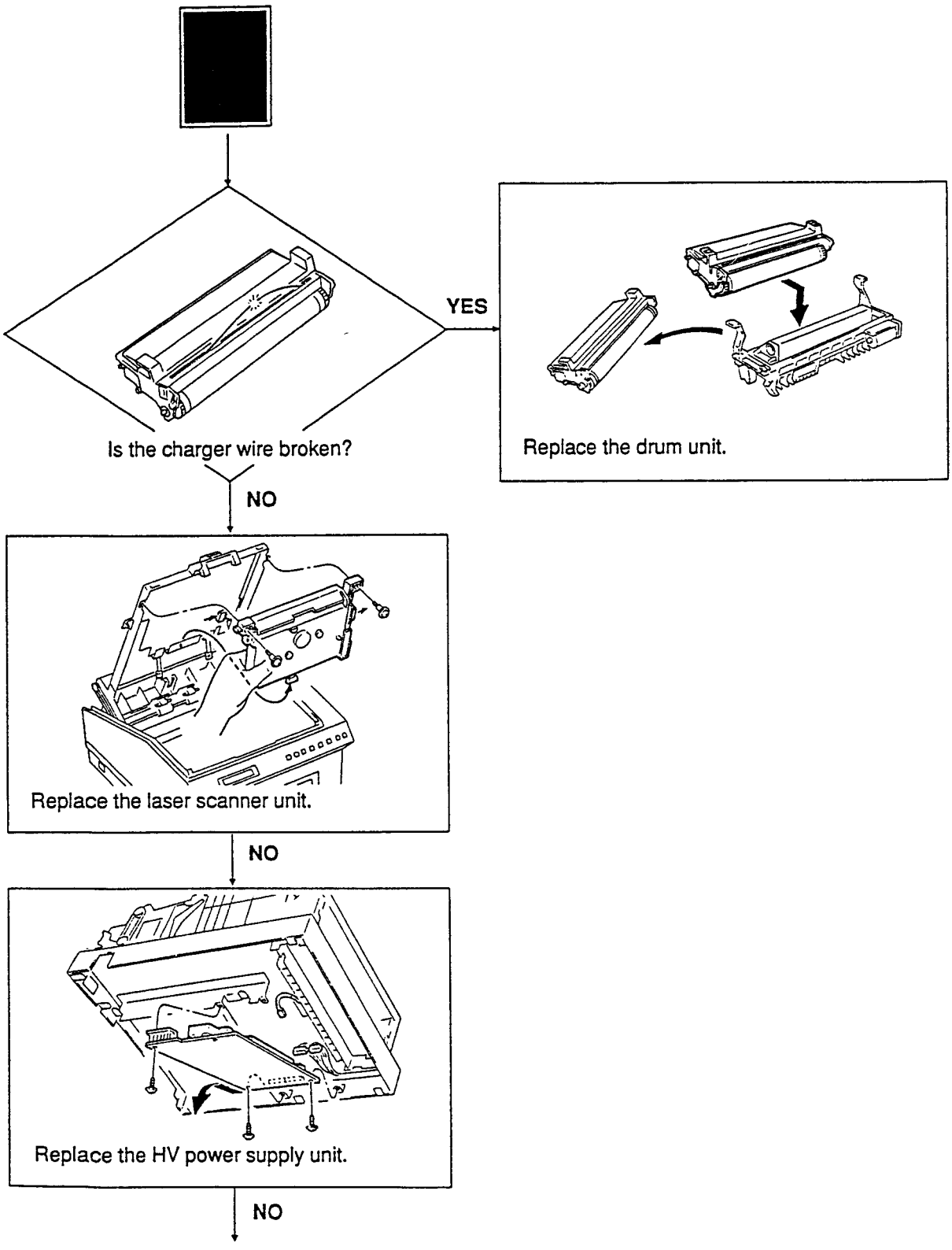


5. Black dots/White dots

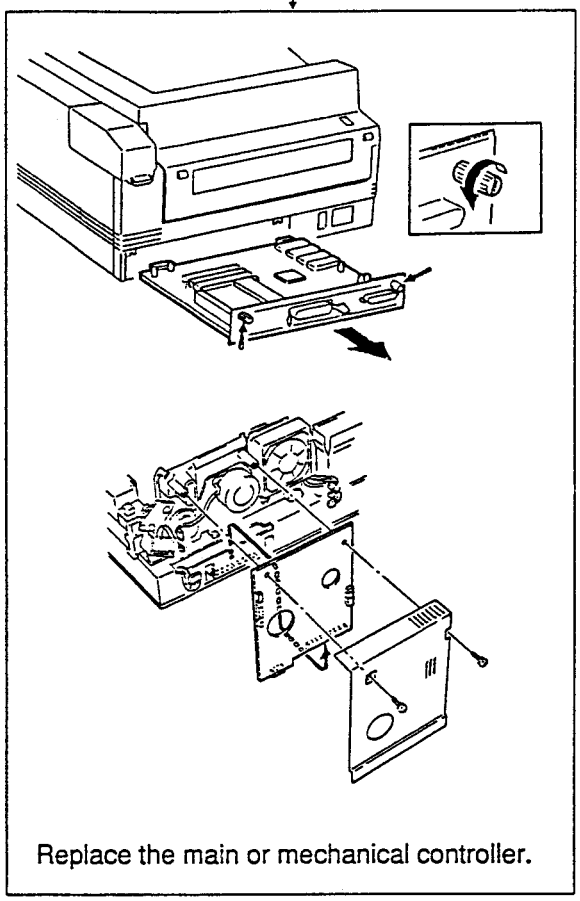

L B
Is the bottom of the drum unit (specially mylar) stained?
YES
NO
Clean the drum unit using a cloth.
* Do not clean and touch the drum surface.
Is the paper transport part (specially rollers) stained?
YES
NO
Clean the paper transport part using a cloth.
Is the cleaning pad stained?
YES
NO
Replace the cleaning pad.


YES
Are black or white dots having 94mm intervals generated?
Replace the drum unit.
NO
YES
Are black or white dots having 76mm intervals generated?
Replace the heat roller unit.
NO
Replace the developer unit.

6. Completely black

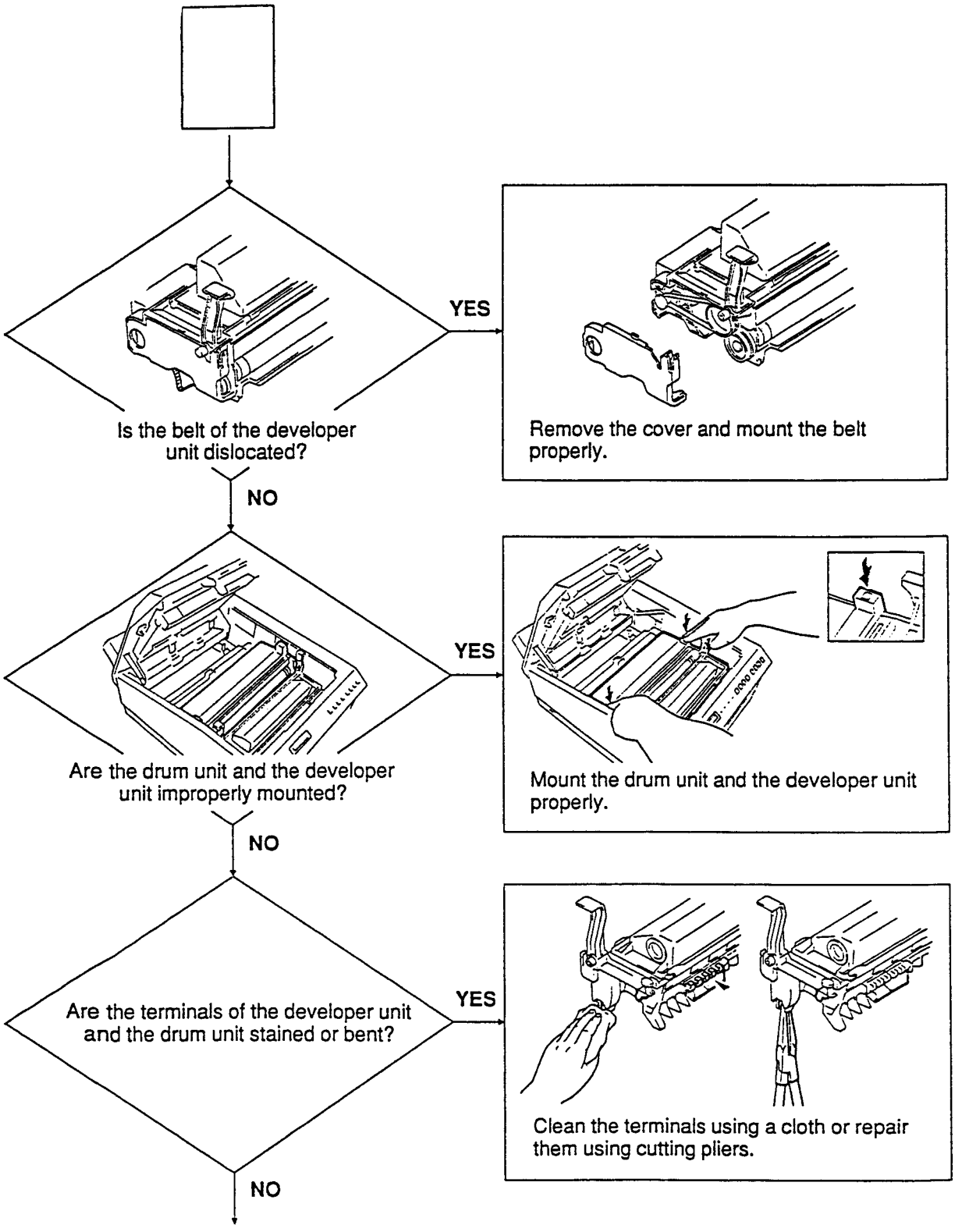


NO



Replace the main or mechanical controller.

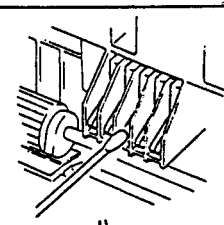
7. Completely white

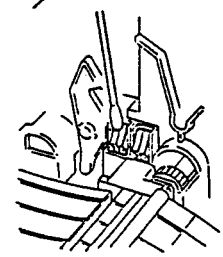

YES
Is the belt of the developer unit dislocated?
Remove the cover and mount the belt properly.
NO
YES
Are the drum unit and the developer unit improperly mounted?
Mount the drum unit and the developer unit properly.
NO
YES
Are the terminals of the developer unit and the drum unit stained or bent?
Clean the terminals using a cloth or repair them using cutting pliers.
NO

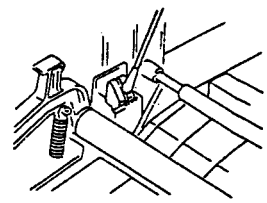
NO

Are the terminals on the both sides of the paper guide stained?

YES

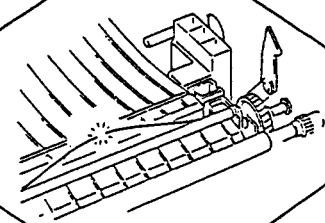




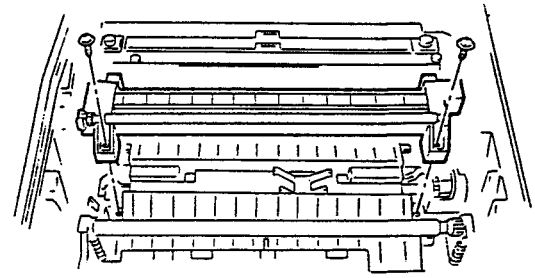


Clean the terminals using a cotton swab.

NO



YES

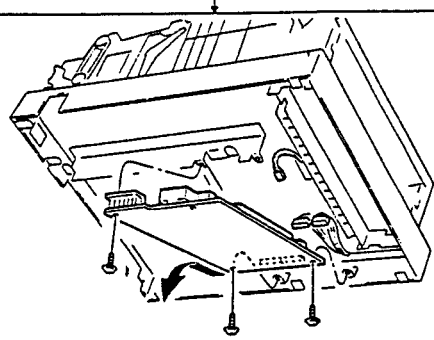


Is the transfer charger broken?

Replace the transfer charger.

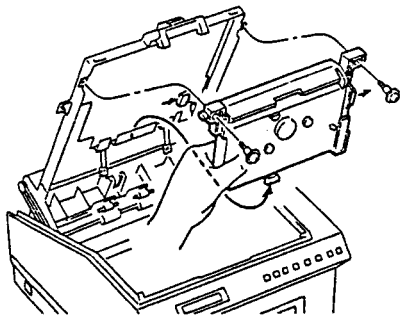
NO

NO



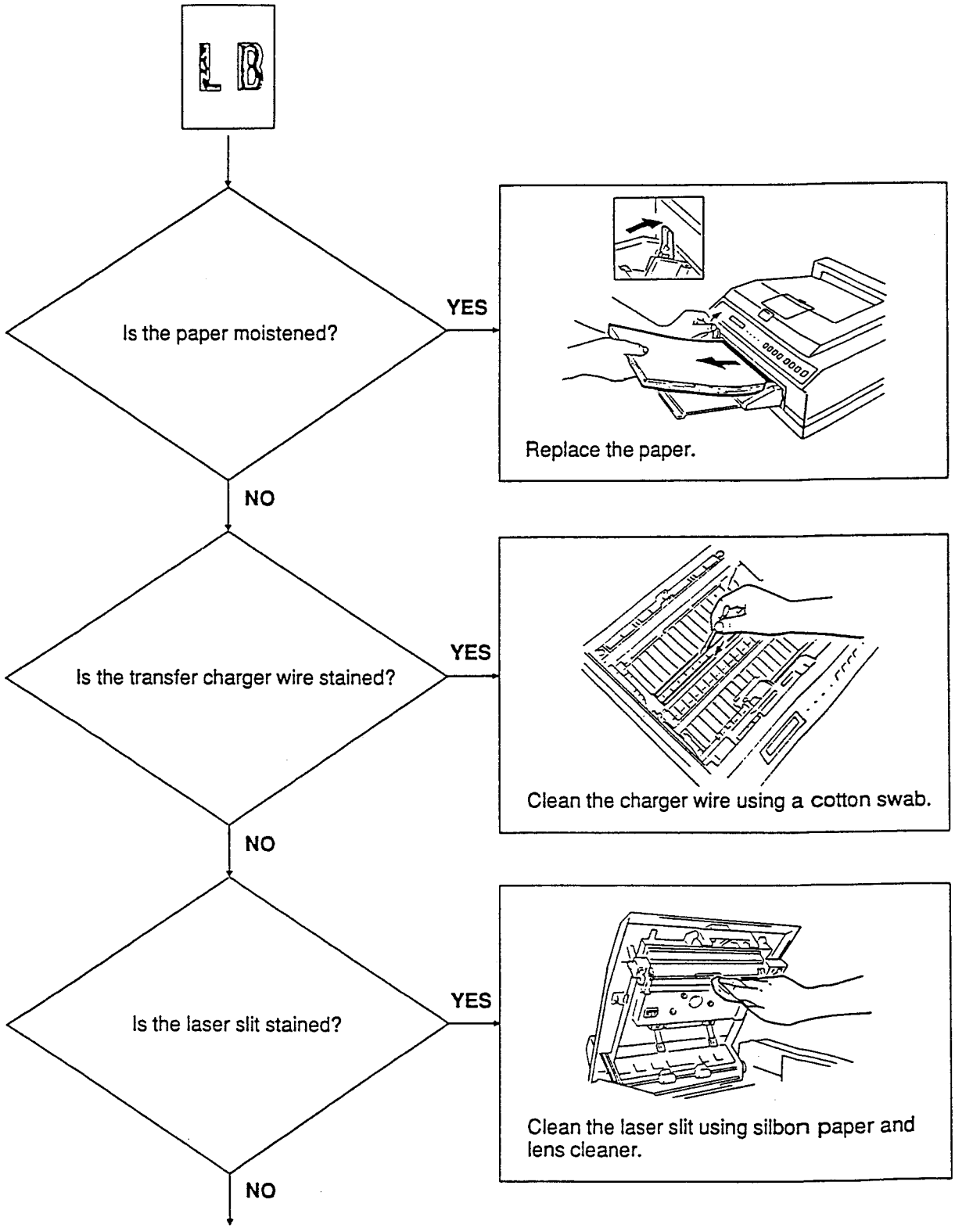
Replace the HV power supply unit.

NO

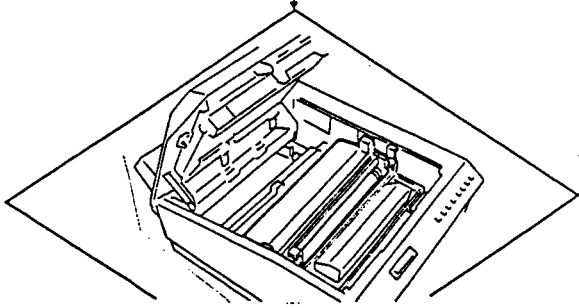


Replace the laser scanner unit.

8. Blurred

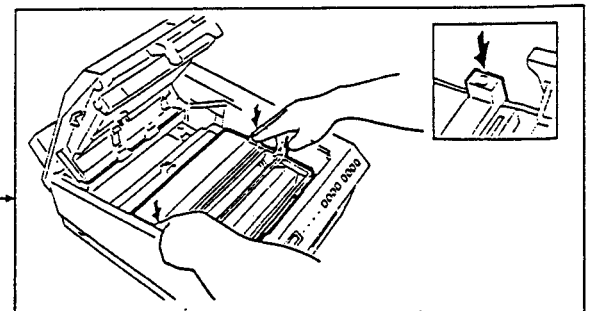

LB
Is the paper moistened?
YES
Replace the paper.
NO
Is the transfer charger wire stained?
YES
Clean the charger wire using a cotton swab.
NO
Is the laser slit stained?
YES
Clean the laser slit using silbon paper and lens cleaner.
NO

NO



YES

Is the drum unit or the developer unit mounted improperly?

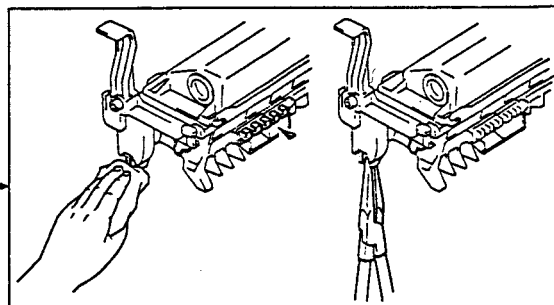


Mount the drum unit or the developer unit properly.

NO

Are the terminals of the developer unit and the drum unit stained or bent?

YES

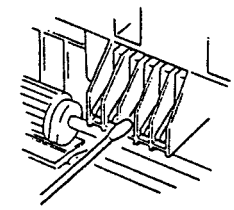


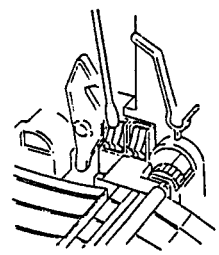
Clean the terminals using a cloth or repair them using cutting pliers.

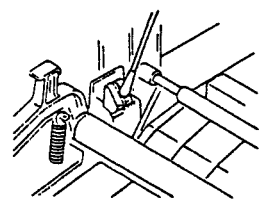
NO

Are the terminals on the both sides of the paper guide stained?

YES

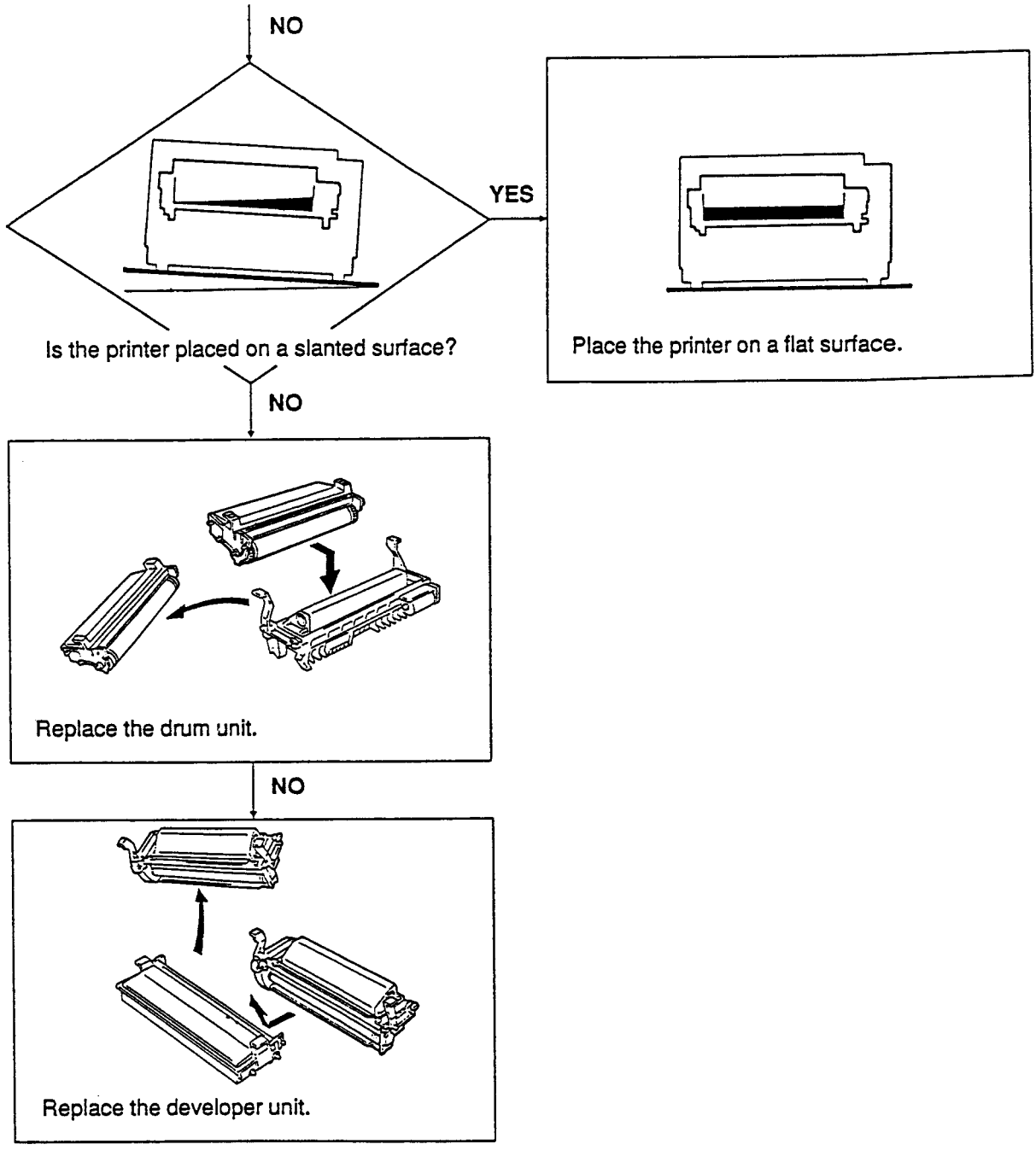




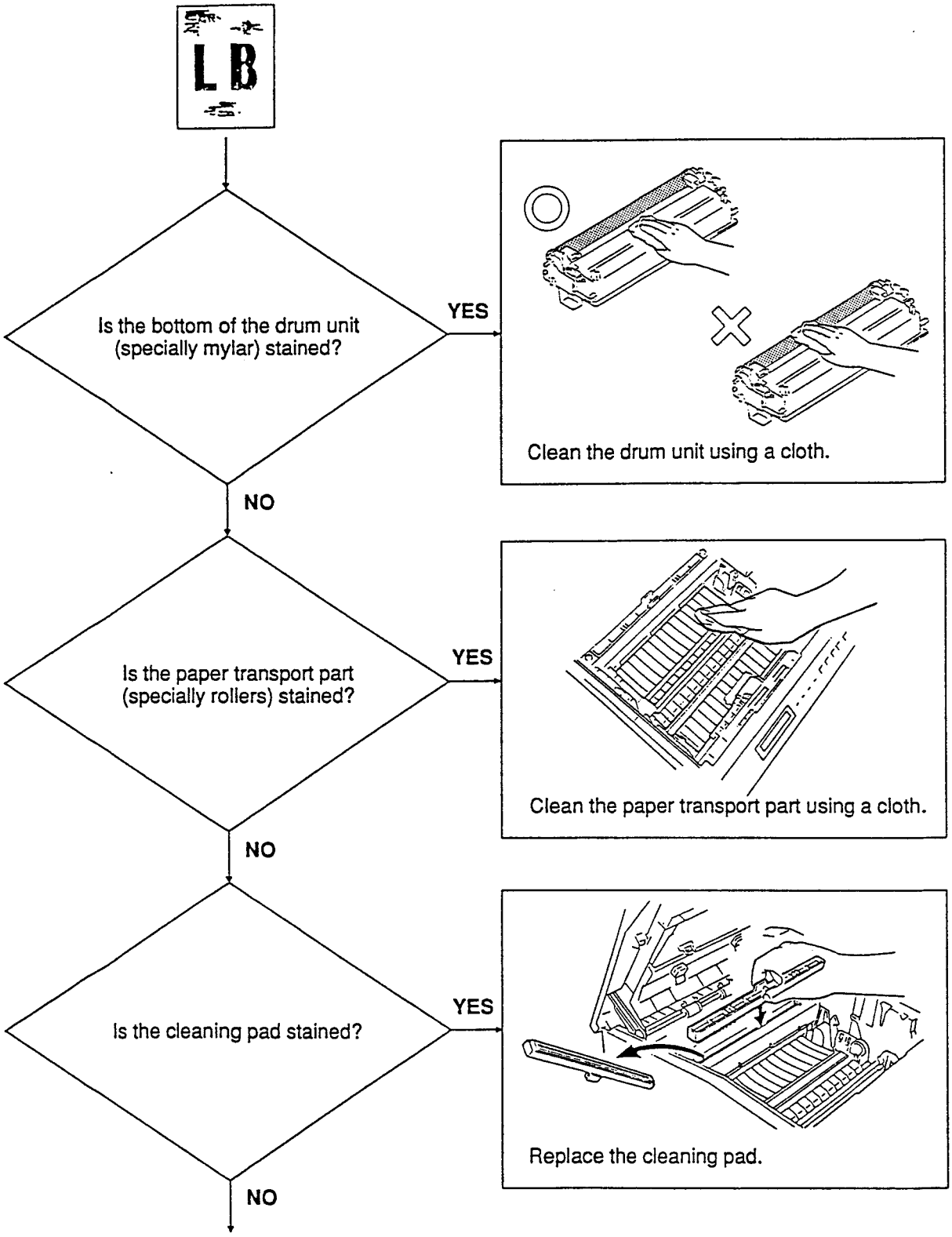


Clean the terminals using a cotton swab.

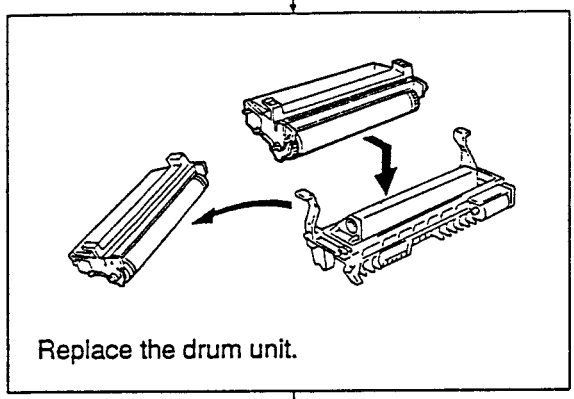
NO


NO
YES
Is the printer placed on a slanted surface?
Place the printer on a flat surface.
NO
Replace the drum unit.
NO
Replace the developer unit.

9. Stained

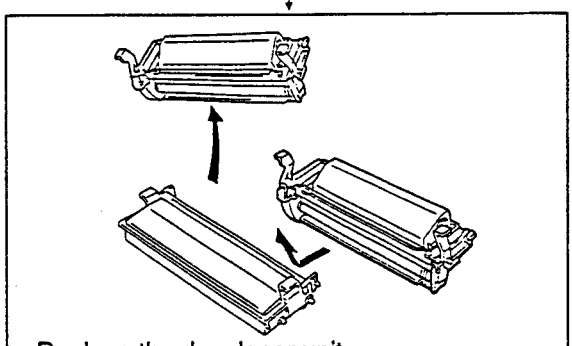

L B
Is the bottom of the drum unit (specially mylar) stained?
YES
Clean the drum unit using a cloth.
NO
Is the paper transport part (specially rollers) stained?
YES
Clean the paper transport part using a cloth.
NO
Is the cleaning pad stained?
YES
Replace the cleaning pad.
NO

NO



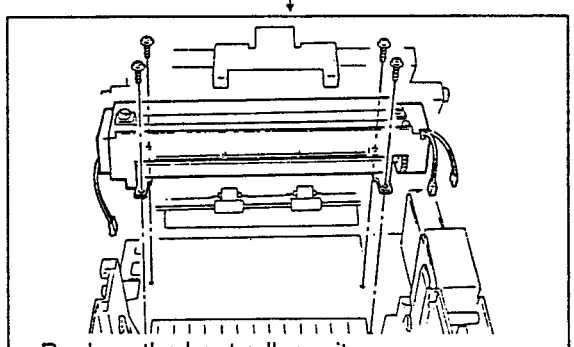
Replace the drum unit.

NO



Replace the developer unit.

NO



Replace the heat roller unit.

APPENDIX
NMS1474
CIRCUIT DESCRIPTION

This manual describes the C-type controller for use in the NMS1474 printer.

1. Features of the ASIC

1.1 Main Controller

(1) 68000 CPU
- 10MHz clock
- 16-bit CPU

(2) Two ASICs

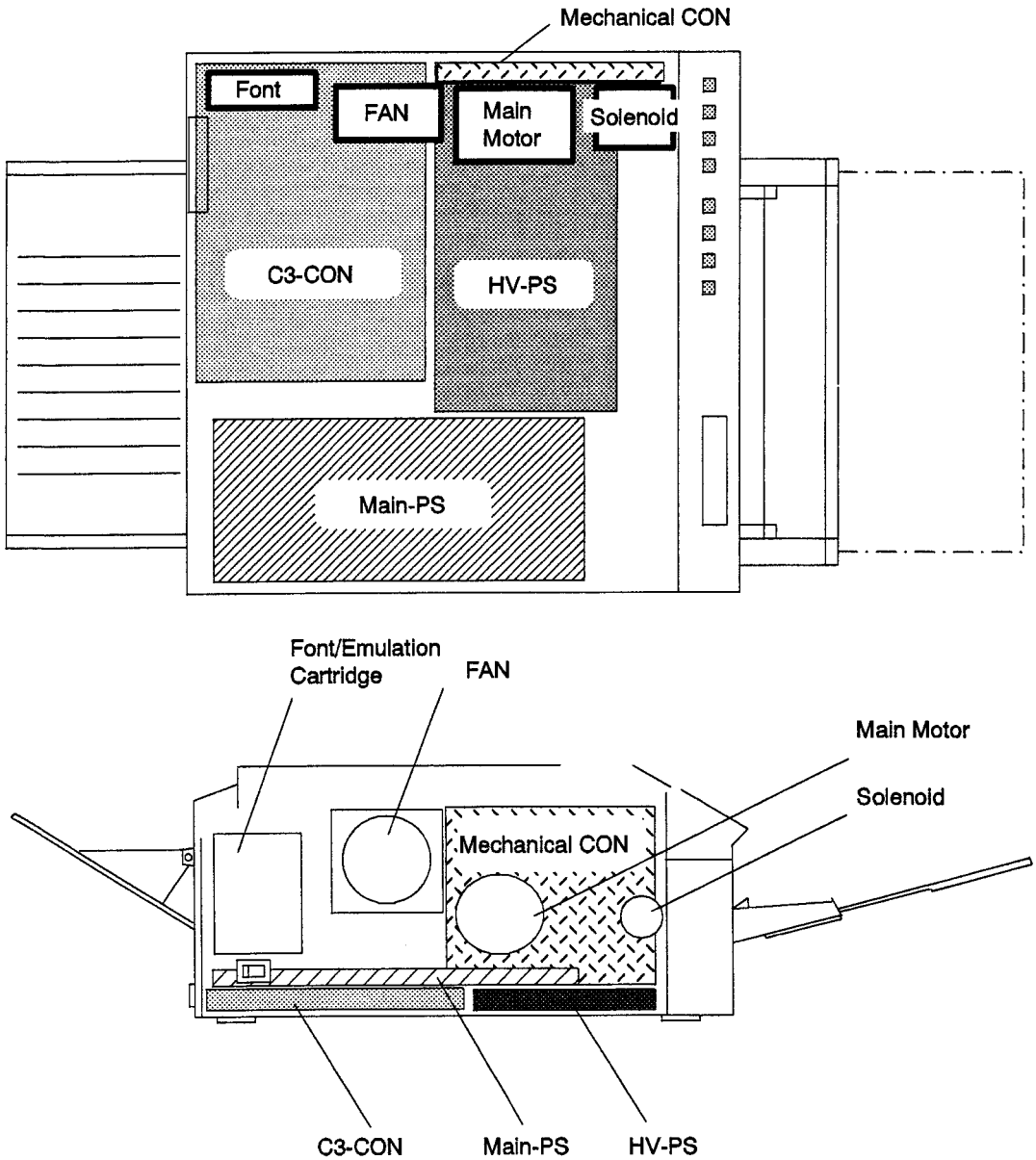
1) EC-A452
- 80-pin gate array
- Parallel interface function
- Serial interface function
- Serial interface baud rate generator
- NOVRAM (X2404) interface
- 4-bit DIP-SW status input
- Chip select signal output

2) D8801S
- 120-pin gate array
- D-RAM refresh control
- Barrel shifter unit built in
- Control signal output of optional memory module
- Interrupt signal decoding for main controller CPU
- Main controller CPU, data acknowledge (DTACK) control
- Font cartridge read control
- Internal timer built in
- Operation panel LED output port

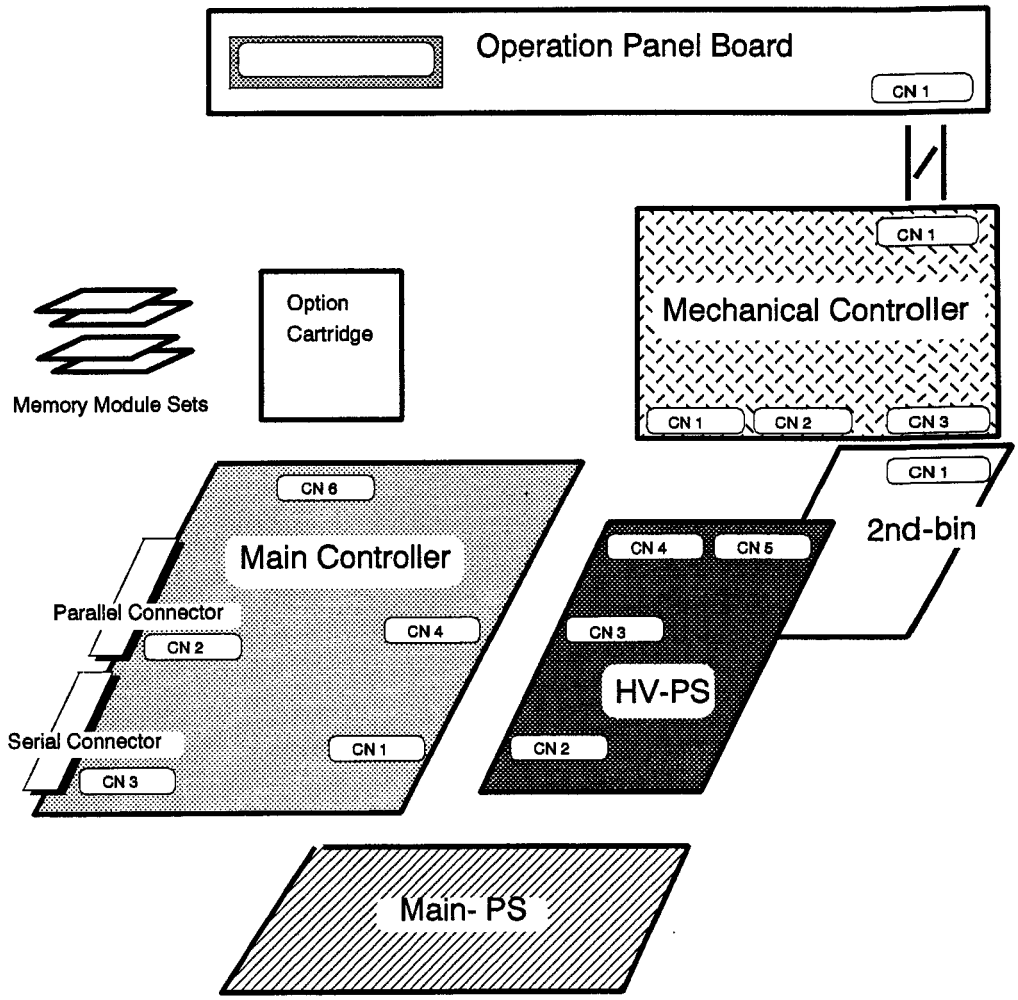
(3) Two program ROMs / two font ROMs for controller
- Selection of jumpers permits accommodation of 2M/1M or 512K and mask ROM or PROM.

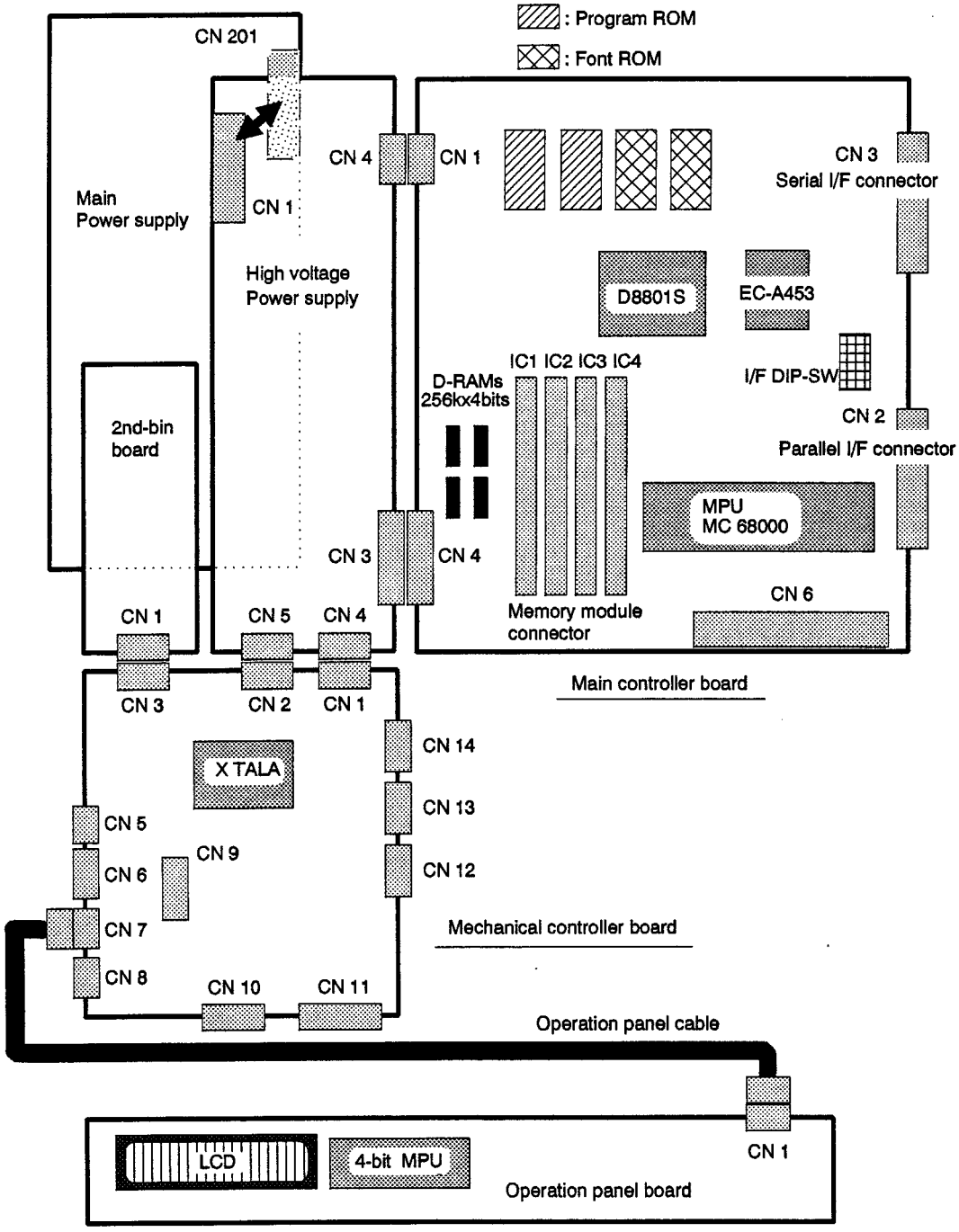
(4) 512K-byte resident RAM
- Use of four 256K by 4-bit D-RAMs

1.2 Mechanical Controller

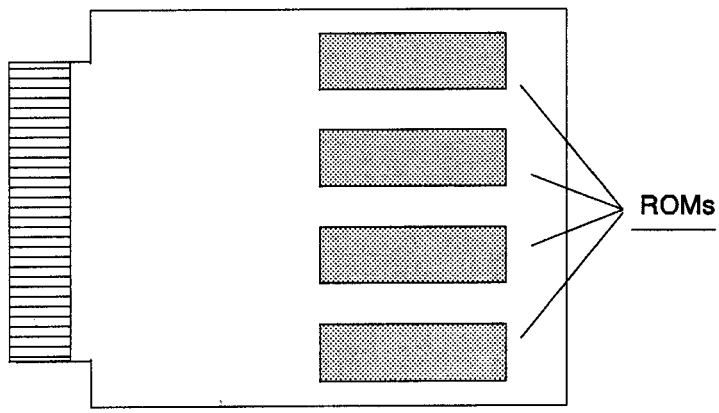


2. Schematic Diagram of the PC Board

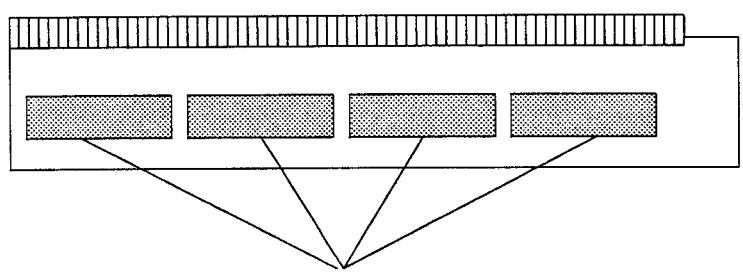



: Program ROM
: Font ROM
CN 201
CN 4
CN 1
CN 3
Serial I/F connector
Main
Power supply
CN 1
High voltage
Power supply
D8801S
EC-A453
IC1 IC2 IC3 IC4
D-RAMs
256kx4bits
I/F DIP-SW
CN 2
Parallel I/F connector
2nd-bin
board
MPU
MC 68000
CN 3
CN 4
CN 6
CN 1
CN 5
CN 4
Memory module
connector
Main controller board
CN 3
CN 2
CN 1
CN 14
X TALA
CN 13
CN 5
CN 9
CN 12
CN 6
CN 7
Mechanical controller board
CN 8
CN 10
CN 11
Operation panel cable
CN 1
LCD
4-bit MPU
Operation panel board

Font cartridge

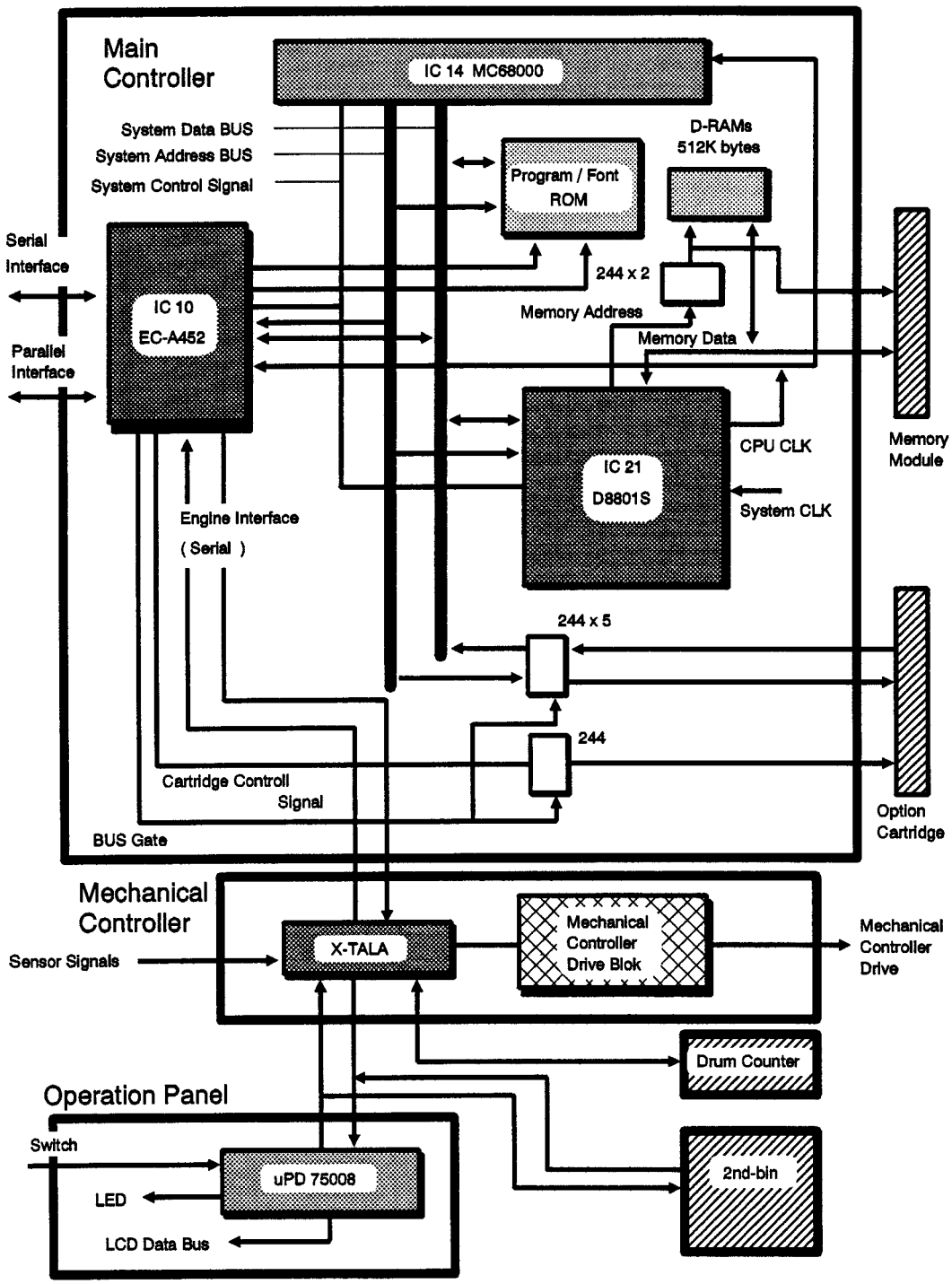


Memory module

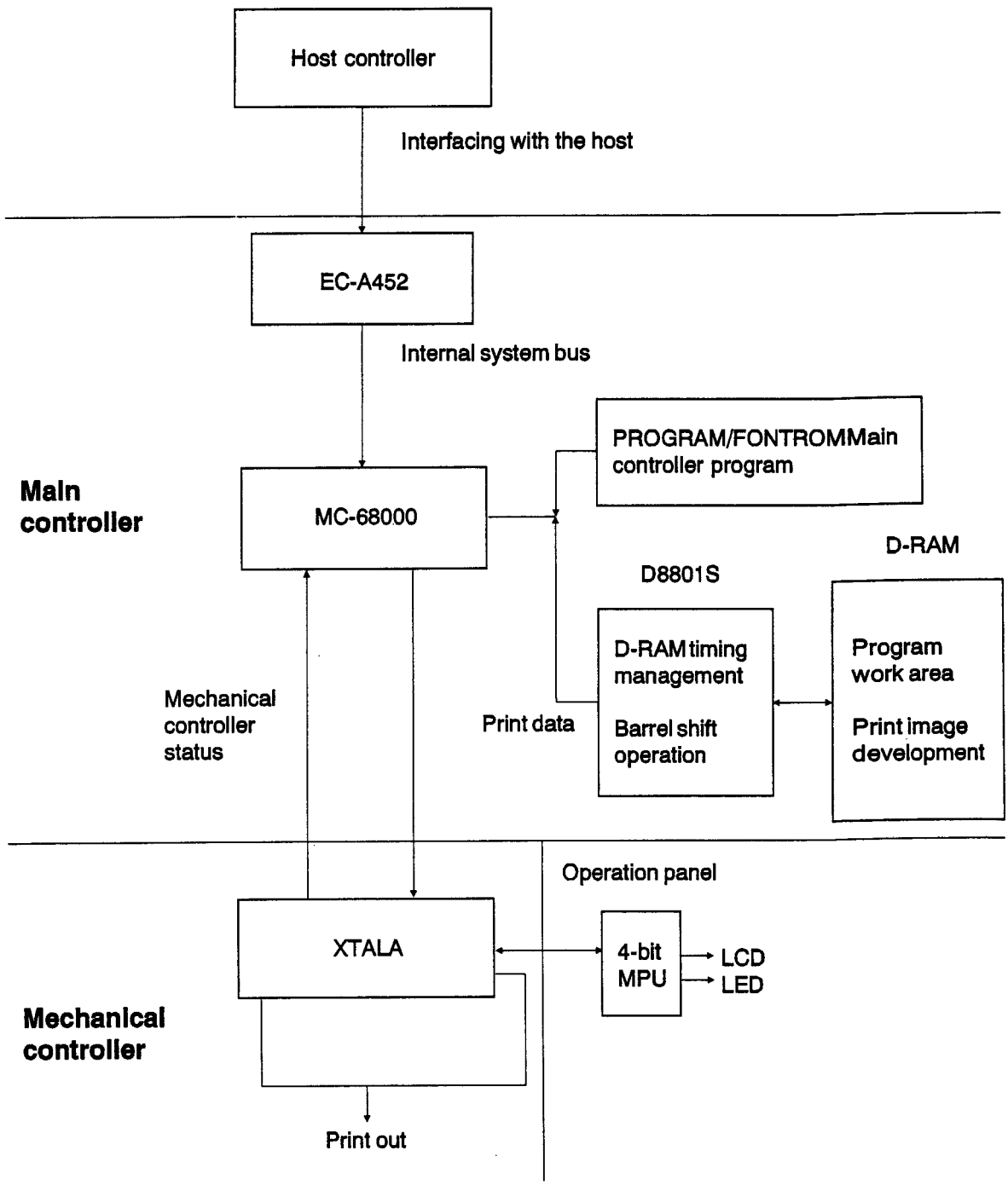


D-RAMs 256k x 4bits

3. Block Diagram



4. Data Flow


Host controller
Interfacing with the host
EC-A452
Internal system bus
PROGRAM/FONTROMMain controller program
Main controller
MC-68000
D-RAM
D8801S
D-RAM timing management
Barrel shift operation
Program work area
Print image development
Mechanical controller status
Print data
Operation panel
XTALA
4-bit MPU
LCD
LED
Mechanical controller
Print out

5. Descriptions of Circuits

This printer consists of the laser unit, operation panel, developer unit, heater unit, etc. with the main controller and mechanical controller as the central components.
For the power supplies, switching power supplies to output +5V, +24V, and +/-12V and a high voltage power supply for the charger are used.
Data from the host PC is inputted to the main controller board. The main controller board has parallel and serial input/output circuits to respond to the Centronics parallel, RS-232C, and RS-422A interfaces. The serial interface circuit has a DIP switch assembly for selecting RS-232C or RS422A. Either interface can be used by setting this DIP switch assembly.
The main controller consists of the CPU, two gate arrays, and memory area. Data from the host PC is inputted to gate array IC10 for interface control, where it is converted into internal data. Then the data is converted by the other gate array, IC21, into print data, and is edited page by page for print and stored in the memory area. The data arranged in pages in memory is developed to video data and sent to the mechanical controller.
The mechanical controller is composed of the drivers corresponding to the respective mechanical units with one gate array as the central component. The controller generates data for each mechanical unit for printing according to data from the main controller. The states of the various sensors which the printer has are managed by the mechanical controller. The status signals from the sensors are processed by the mechanical controller and sent to the main controller.

5.1 Main Controller

The main controller is a PCL* (Printer Control Language) controller PC board for high speed data processing/high quality print, which has been developed for use in the LB-1321 Series.

* PCL ... A printer control language designed for high quality print of characters and bit map graphics. It is adopted by very many commercially available applications.

With its respective components designed as ASICs (Application Specific IC), this controller has improved its reliability and assures operation in a wide range of supply voltages.
Using two gate arrays IC10 and IC21 with the IC14 (16-bit 68000 CPU) as the central component, the main controller processes input data, manages the memory area, etc.
A 0MHz clock is sent from IC21 to the CPU. The CPU receives the clock into pin 15 and uses it as a main clock. Gate array IC10 controls the interface signals, processes the status signals of the DIP switches, and manages status information. The 10MHz clock from IC21 is also inputted to IC10 which also uses the clock as a reference clock for its operation.
Data from the host PC is sent from connector 4 to IC10 where it is processed and put onto the bus lines.
Upon receipt of an interface signal, IC10 sends an interrupt signal to IC21. It sends a PIRQ0 signal in the case of the parallel interface, and a SIRQ0 signal in the case of the serial interface. When the interrupt signal is accepted, the data in IC10 is put onto the data bus lines and inputted in C21
An interface signal is sent from the printer to the host PC. This signal is inputted from the data bus line to IC10 where it is converted to an interface signal and sent out. Printer status is managed by communicating data between pins 33 and 14 and IC13.
The IC13 nonvolatile static RAM stores printer status information, and receives and sends data using the serial clock (X245K) from IC22 as a reference clock. IC13 is an EE-PROM and its write life is 100,000 times. However, it is long enough considering the life of the printer.
Gate array IC10 manages the memory area where data from the interface controller is developed to video data. Receiving a 20MHz clock from OSC1, IC10 frequency-divides the clock for using it as a reference clock and at the same time supplies it as a reference clock for other devices. IC10 develops received print data to video data according to the main program.
The main program of the printer is stored in IC23 and IC25 within the memory area. Their capacity is a total of 2M bits, 1M bits plus 1M bits. The resident fonts held by the printer are stored in IC22 and IC24. Their capacity is a total of 2M bits, 1M bits plus 1M bits.
Print data is developed to IC30-IC33 D-RAMs; address data from the CPU is converted by IC21 into address data for D-RAMs to store print data in D-RAMS. For storing, 16 bit data is stored at the prescribed addresses according to the D-RAM control signal from IC21.

The standard RAM area has a memory capacity of 512K bytes. Of the capacity, 395K bytes are used as page memory, and video data is stored page by page.
IC1, IC2, IC3, and IC4 in the memory area are an area for optional memory modules. A combination of memory modules permits memory expansion of 1M or 2M. The optional RAM area is managed in the same manner as the standard RAM area. Each area is identified by selecting a memory bank according to row address strobe signals RAS-RAS7 from IC21. The IPL0-IPL2 signals output from IC21 interrupt the CPU when processing data, etc.
When one page of video data is completed in the memory area, the data is sent to the mechanical controller. The mechanical controller sends or receives data from the memory area through CN4. A video clock and video sync signal are sent from the mechanical controller to the main controller. The mechanical controller sends the video signal synchronizing with the video clock and video sync signal.
Also sent to the mechanical controller are a Start signal for indicating the start of print, Form Select signal for indicating the paper size, 80 Character Select signal for printing 80 characters per line, Thick Paper signal indicating the use of thick paper, etc. On the other hand, the mechanical controller sends a Reset signal, Request signal for data, Error Code signal indicating an error, etc.
CN5 and CN6 are connectors for attaching an optional font cartridge and emulation cartridge. When connected, such cartridges also become stored areas for font and program data.
CN2 is a connector for attaching the operation panel, and receives status signals from the key switches, sends control signals, and sends data to the LCD. The E clock is a clock signal to the LCD unit. The LCD unit operates this signal as a reference.

5.1.1 Functions of the EC-A452

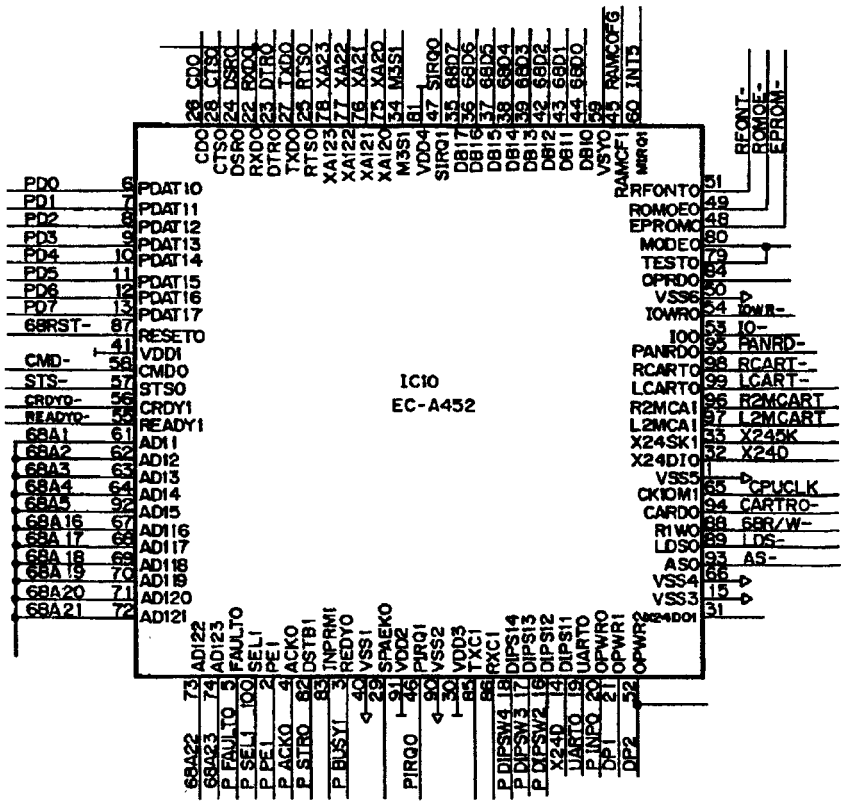


Fig. A-7 EC-A452 Functional Pin Layout

Pin No.	Pin Name	Pin No.	Pin Name	Pin No.	Pin Name	Pin No.	Pin Name
1	PD0	26	68A22	51	NC	76	DTR0
2	PD1	27	68A23	52	GND	77	GND
3	PD2	28	5V	53	NC	78	RXD0
4	PD3	29	5V	54	RTS0	79	DSR0
5	PD4	30	PBUSY1	55	TXD0	80	CTS0
6	PD5	31	NC	56	PPE1		
7	PD6	32	SPEAK0	57	GND		
8	PD7	33	NC	58	NC		
9	NC	34	PIRQ0	59	SDC1		
10	NC	35	CD0	60	RXRDY		
11	68RST-	36	PDIPSW4	61	TXRDY		
12	GND	37	PDIPSW3	62	68D0		
13	CPUCLK	38	PDIPSW2	63	68D1		
14	SASCS0	39	X24DO	64	68D2		
15	68A1	40	NC	65	68D3		
16	68A2	41	PINP0	66	68D4		
17	68A3	42	PSTR0	67	68D5		
18	68A4	43	AS-	68	68D6		
19	86A5	44	LDS-	69	68D7		
20	68A16	45	68R/W-	70	NC		
21	68A17	46	PDIPSW1	71	PSEL1		
22	68A18	47	GND	72	GND		
23	68A19	48	PACK0	73	5V		
24	68A20	49	X24OI1	74	PFAULT0		
25	68A21	50	X245K	75	SIRQ0		

Pin Table (No. 1)

Pin No.	Pin Name	IO	Pin No.	Pin Name	IO
1	VSS	—	26	CD0	IN
2	PE1	OUT	27	TXD0	OUT
3	REDY0	OUT	28	CTS0	IN
4	ACK0	OUT	29	SPEAK0	OUT
5	FAULT0	OUT	30	VDD	—
6	PDAT10	IN	31	X24DO1	IN
7	PDAT11	IN	32	X24DI0	OUT
8	PDAT12	IN	33	X24SK1	OUT
9	PDAT13	IN	34	M3S1	IN
10	PDAT14	IN	35	DB17	I/O
11	PDAT15	IN	36	DB16	I/O
12	PDAT16	IN	37	DB15	I/O
13	PDAT17	IN	38	DB14	I/O
14	DIPS11	IN	39	DB13	I/O
15	VSS	—	40	VSS	—
16	DIPS12	IN	41	VDD	—
17	DIPS13	IN	42	DB12	I/O
18	DIPS14	IN	43	DB11	I/O
19	UART0	IN	44	DB10	I/O
20	OPWR0	I/O	45	RAMCF1	IN
21	OPWR1	I/O	46	PIRQ1	OUT
22	RXD0	IN	47	SIRQ1	OUT
23	DTR0	OUT	48	EPROM0	OUT
24	DSR0	IN	49	ROMOE0	OUT
25	RTS0	OUT	50	VSS	—

Pin Table (No. 2)

Pin No.	Pin Name	IO	Pin No.	Pin Name	IO
51	RFONT0	OUT	76	XA121	OUT
52	OPWR2	I/O	77	XA122	OUT
53	IO0	IN	78	XA123	OUT
54	IOWR0	IN	79	TEST0	IN
55	READY1	IN	80	MODE0	IN
56	CRDY1	IN	81	VDD	—
57	STS0	IN	82	DSTB1	IN
58	CMD0	OUT	83	INPRM1	IN
59	VSY0	IN	84	OPRD0	OUT
60	MIRQ1	OUT	85	TXC1	I/O
61	AD11	IN	86	RXC1	I/O
62	AD12	IN	87	RESET0	IN
63	AD13	IN	88	R1W0	IN
64	AD14	IN	89	LDS0	IN
65	CK10M1	IN	90	VSS	—
66	VSS	—	91	VDD	—
67	AD116	IN	92	AD15	IN
68	AD117	IN	93	AS0	IN
69	AD118	IN	94	CARD0	OUT
70	AD119	IN	95	PANRD0	OUT
71	AD120	IN	96	R2MCA1	OUT
72	AD121	IN	97	L2MCA1	OUT
73	AD122	IN	98	RCART0	OUT
74	AD123	IN	99	LCART0	OUT
75	XA120	OUT	100	SEL1	OUT

ECA329 Signals

Pin No.	Signal Name	Full Name of Signal	I/O	Logic Polarity	Remarks
7,8,9 11,12,13	PD0 -PD7	Parallel data	I	H	Parallel data
87	68RST-	68000 reset	I	L	68000 reset signals
65	CPUCLK	CPU clock	I		CPU clock
14	PASCS0	Parallel and serial GA chip select	I	L	Parallel and serial GA chip select
62, 63, 64 68, 69 71,72,74	68 A1 - 68A5 68A16 - 68A23	68000 Address bus	I	H	Address bus from 68000
3	P BUSY1	Parallel I/F busy	O	H	Parallel I/F busy
29	SPEAK0	Speaker	O	L	Speaker
46	PIRQ0	Parallel interrupt request	O	L	Parallel interrupt request
26	CD0	Carrier detect	I	L	Carrier detect
18	P DIPSW4	Parallel DIP SW	I	H	Parallel DIP SW
17	P DIPSW3	Parallel DIP SW	I	H	Parallel DIP SW
16	P DIPSW2	Parallel DIP SW	I	H	Parallel DIP SW
31	P DIPSW1	X2404 data output	I	H	X2404 data output
83	P INP0	Parallel input prime	I	L	Parallel input prime
82	P STR0	Parallel strobe	I	L	Parallel strobe signals
93	AS-	Address strobe	I	L	Address strobe signals
89	LDS-	Lower data strobe	I	L	Lower data strobe signals from 68000
88	68R/W-	68000 Read /write	I	L	Read /write signal from 68000
14	X24D	Parallel DIP SW	I	H	Parallel DIP SW
4	PACK0	Parallel acknowledge	O	L	Parallel acknowledge
32	X24D	X2404 data input	O	L	X2404 data input

33	X245K	X2404 serial clock	O	H	X2404 serial clock
25	RTS0	Request to send	O	L	Request to send
27	TXD0	Transmit data	O	L	Transmit data
2	PPE1	Parallel paper empty	O	H	Parallel paper empty
36,37,38 42,43	68D0 -68D7	68000 Data bus	I/O	H	Data bus from 68000
100	PSEL1	Parallel select	O	H	Parallel select signals
5	PFAULT0	Parallel fault	O	L	Parallel fault signals
47	SIRQ0	Serial interrupt	O	L	Serial interrupt request
23	DTR0	Data transmit ready	O	L	Data transmit ready
22	RXD0	Receive data	I	L	Receive data
24	DSR0	Data set ready	I	L	Data set ready
28	CTS0	Clear to send	I	L	Clear to send
45	RAMCOFG	RAM configuration	I	H	RAM configuration
49	ROMOE-	Rom output enable	O	L	Rom output enable signals
48	EPROM-	EPROM chip select	O	L	EPROM chip select
51	RFONT-	Resident font	O	L	Resident font
53	IO-	Input output signals	I	L	Input output signals
54	IOWR-	IO write strobe	I	L	IO write strobe
99	LCART-	Left cartridge select	O	L	Left cartridge select signals
98	RCART-	Right cartridge select	O	L	Right cartridge select signals
97	L2MCART	Left 2M-byte cartridge	O	H	Left 2M-byte cartridge
96	R2MCART	Right 2M-byte cartridge	O	H	Right 2M-byte cartridge
95	PANRD-	Panel read	O	L	Operation panel read signals
94	CARTRD-	Cartridge read	O	L	Cartridge read signals

84	OPRD0	Option read	O	L	Option read signals
75 | 78	XA20 - 23	Exchanged address bus	O	H	Exchanged address bus
55	READY0-	Ready	I	L	Engine I/F ready signals
56	CRDY0-	Command ready	I	L	Command ready signals
57	STS-	Engine status	I		Basic status of Engine I/F
58	CMD-	Command data	O		Command data to Engine I/F
59	VSY-	Video synchronization	I		Video synchronization signals
60	INT5	Interrupt input 5	I	H	Interrupt input from the external sources
34	M351	Memory 3M-byte select	I		Memory 3M-byte select

68R/W- (Input, Read: High/Write: Active-low)

68R/W- is a Read/Write signal which is inputted from the IC14 CPU(MC68000 10MHz) to the EC-A452.

68R/W- (Input, Active-low)

An address strobe signal which is inputted from the IC14 CPU to the EC-A452.
LDS- (Input, Active-low)

LDS- is a low order data strobe signal which is inputted from the IC14 CPU to the EC-A452.

Address Bus 68A1-A5, 68A16-A23 (13 lines: Input, Active-high)

68A1-A5 and 68A16-A23 are address bus lines which are inputted from the IC14 CPU to the ECA-452.

Data Bus 68D0-68D7 (8 lines: Bidirectional, Active-high)

68D0-D7 are data bus lines which are inputted and outputted from the IC14 CPU to the EC-A452.

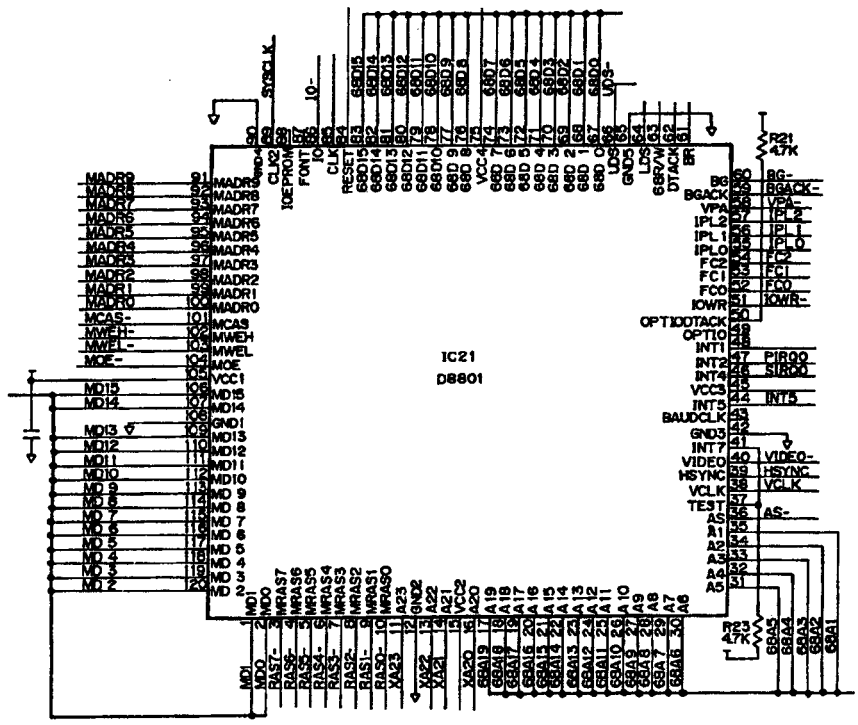
Reset Signal 68RST- (Input, Active-low)

68RST- is a reset signal which is inputted from the M51957BL reset IC to the EC-452.

CPUCLK (Input, Active-high)

CPUCLK is a system clock which is inputted from the D8801 to the EC-452.

5.1.2 Functions of the D880IS



Pin No.	Pin Name	Pin No.	Pin Name	Pin No.	Pin Name	Pin No.	Pin Name
1	MD1	21	68A15	41	5V	61	NC
2	MD0	22	68A14	42	GND	62	NC
3	RAS7-	23	68A13	43	NC	63	NC
4	RAS6-	24	68A12	44	INT5	64	NC
5	RAS5-	25	68A11	45	NC	65	GND
6	RAS4-	26	68A10	46	INT4	66	UDS-
7	RAS3-	27	68A9	47	INT2	67	68D0
8	RAS2-	28	68A8	48	5V	68	68D1
9	RAS1-	29	68A7	49	NC	69	68D2
10	RAS0-	30	68A6	50	5V	70	68D3
11	XA23	31	68A5	51	IOWR-	71	68D4
12	NC	32	68A4	52	FC0	72	68D5
13	XA22	33	68A3	53	FC1	73	68D6
14	XA21	34	68A2	54	FC2	74	68D7
15	NC	35	68A1	55	IPL0	75	NC
16	XA20	36	AS-	56	IPL1	76	68D8
17	68A19	37	5V	57	IPL2	77	68D9
18	68A18	38	VCLK	58	VPA-	78	68D10
19	68A17	39	HSYNC	59	BGACK-	79	68D11
20	68A16	40	VIDEO-	60	BG-	80	68D12

81	68D13	91	MADR9	101	MCAS-	111	MD11
82	68D14	92	MADR8	102	MWEH-	112	MD10
83	68D15	93	MADR7	103	MWEL-	113	MD9
84	68RST-	94	MADR6	104	MOE	114	MD8
85	CPUCLK	95	MADR5	105	NC	115	MD7
86	IO-	96	MADR4	106	ND15	116	MD6
87	NC	97	MADR3	107	MD14	117	MD5
88	NC	98	MADR2	108	GND	118	MD4
89	SYSCLK	99	MADR1	109	MD13	119	MD3
90	GND	100	MADR0	110	MD12	120	MD2

D8801 Signals

Pin No.	Signal Name	Full Name of Signal	I/O	Logic Polarity	Remarks
89	SYSCLK	System Clock	I	H	Clock Input for D8801
85	CPUCLK	CPU Clock	O	H	CPU Clock to 68000 It is one half of the SYSCLK.
35, 34, 33, 32, 31, 30, 29, 28, 27, 26, 25, 24, 23, 22, 21, 20, 19, 18, 17	68A1 -68A19	68000 Address bus	I	H	Address bus from 68000
16, 14, 13, 11	XA20 -XA23	X.Address bus	I	H	Address bus from EC-A452
67, 68, 69, 70, 71, 72, 73, 74, 76, 77, 78, 79, 80, 81, 82, 83	68D0 -68D15	68000 Data bus	I/O	H	Data bus from 68000
36	AS-	Address Strobe	I	L	Address Strobe signal from 68000
47, 46 44	INT2, 4, 5	Interrupt inputs	I	H	Interrupt inputs from the external sources
55, 56, 57	IPL0 -IPL2	Interrupt levels	O	H	Interrupt levels to 68000
58	VPA-	Valid peripheral address	O	L	Valid peripheral address output to 68000
61	BR-	Bus request	O	L	Bus request to 68000
60	BG-	Bus grant	I	L	Bus grant from 68000
59	BGACK-	Bus grant acknowledge	O	L	Bus grant acknowledge to 68000
62	DTACK-	Data transfer acknowledge	O	L	Data transfer acknowledge to 68000

Pin No.	Signal Name	Full Name of Signal	I/O	Logic Polarity	Remarks
63	68R/W-	68000Read/write	I	-	Read/write signal from 68000
64	LDS-	Lower data strobe	I	L	Lower data strobe signal from 68000
66	UDS-	Upper data strobe	I	L	Upper data strobe signal from 68000
52,53, 54	FC0 -FC2	Function codes	I	H	Function codes from 68000
84	68RST-	68000Reset	I	L	Reset input
86	IO-	I/O (Input/output signal)	O	L	Active when IO space is being accessed
51	IOWR-	IO write strobe	O	L	
100,99, 98,97, 96,95, 94,93, 92, 91	MADR0 -MADR9	Memory address D-RAM	O	H	D-RAMaddress
2,1, 120,119, 118,117, 116,115, 114,113, 112,111, 110,109, 107,106	MD0 -MD15	Memory data	I/O	H	D-RAM data input and output
10,9,8, 7,6,5, 4,3	RAS0- -RAS7-	Row address strobe	O	L	Row address strobe signals for D-RAM
101	MCAS-	Memory column address	O	L	Column address strobe signals for D-RAM
103	MWEL-	Memory write enable Low	O	L	Lower byte write enable for D-RAM
102	MWEH-	Memory write enable High	O	L	Higher byte write enable for D-RAM
104	MOE-	Memory output enable	O	L	D-RAM output enable

38	VCLK	Video clock	I	H	Video clock input
39	HSYNC	Horizonal synchroni-zation	I	H	Horizonal synchronization signal from engine
40	VIDEO-	Video output	O	L	Video output to engine

SYSCLCK (Input)

SYSCLK is a 20MHz basic clock which is inputted from the crystal oscillator to the D8801. A 10MHz clock generated by dividing the 20MHz clock by two in the D8801 is output from pin 85 as CPUCLK.

CPUCLK (Input)

CPUCLK is inputted from the IC14 CPU to the EC-A452 as a system clock.

Address Bus 68A1-68A19 (19 lines: Input, Active-high)

68A1-68A19 are a group of 19 signals which are output by the IC14 CPU when accessing a desired memory or I/O within the 16M-byte memory and I/O space.

Data Bus 68D0-69D15 (16 lines: Bidirectional, Active-high)

68D0-68D15 are a group of 16 signal lines (bits) over which program, memory and I/O data is inputted/outputted when the IC14 CPU accesses a memory or I/O.
The D8801 inputs and outputs memory data in the memory area (resident D-RAM and memory module) to the IC14 CPU.

AS- (Input, Active-low)

AS- is an address strobe which is inputted from the IC14 CPU to the D8801. This signal indicates whether an effective address is put onto the address bus.

INT2, INT4, INT5 (Input, Active-low)
IPL0, IPL1, IPL2 (Output, Active-low)

INT2, INT4, and INT5 are interrupt signals which are inputted to the D8801. The three interrupt signals are coded by the interrupt priority encoder into four levels of priority signals, IPL0, IPL1, and IPL2. The D8801 sends these signals (pins 55, 56, 57) to the IC14 CPU.

Shown below are the concept of the interrupt priority encoder and the relations between the interrupt factors and priority order (IPL0, IPL1, and IPL2).

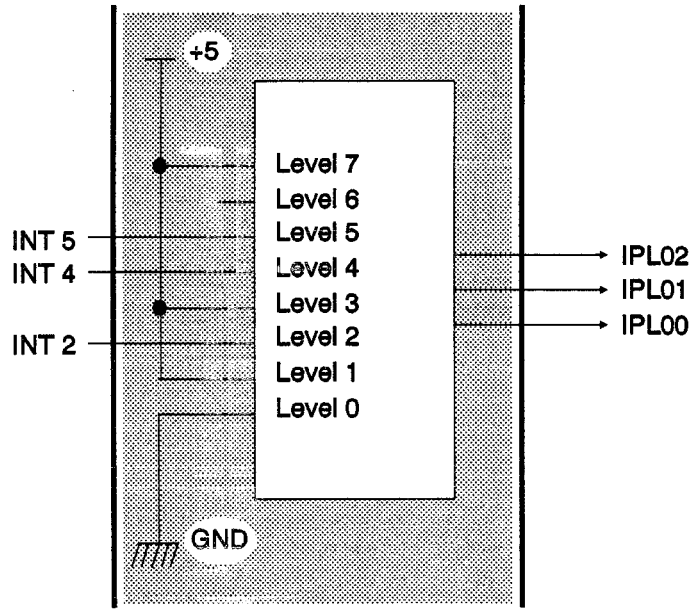


Fig. A-9 Concept of the Interrupt Factor Priority Encoder

VPA- (Output, Active-low)
FC0, FC1, FC2 (Input, Active-high)

VPA is an available peripheral address signal which is sent from the D8801 to the IC14 CPU. This signal indicates that the processor should use the automatic vectoring method for interrupts. Using the fact that when the function code signals (FC0, FC1, and FC2) of the CPU indicate an interrupt acknowledge they are all output at the High level, *** is output as VPA-.

BGACK- (Output, Active-low)

BGACK is a bus grant acknowledge which is sent from the D8801 to the IC14 CPU.

DTACK- (Output, Active-low)

DTACK- is a data transfer acknowledge which is sent from the D8801 to the IC14 CPU.

68R/W- (Input, Read: High/Write: Active-low)

68R/W- is a read/write signal which is inputted from the IC14 CPU to the D8801.

UDS-/LDS- (Input, Active-low)

UDS-/LDS- is a high order/low order data strobe signal which is inputted from the IC14 CPU to the D8801. This signal controls the data bus in combination with the 68R/W- signal. Shown below is control of the data bus by the data strobe.

Table A-2 Data Bus Control by the Data Strobe

UDS0	LDS0	R1W0	D8 - D15	D0 - D7
H	H		Invalid data	Invalid data
L	L	H	Valid data bits 8 to 15	Valid data bits 0 to 7
H	L	H	Invalid data	Valid data bits 0 to 7
L	H	H	Valid data bits 8 to 15	Invalid data
L	L	L	Valid data bits 8 to 15	Valid data bits 0 to 7
H	L	L	Valid data bits 0 to 7*	Valid data bits 0 to 7
L	H	L	Valid data bits 8 to 15	Valid data bits 8 to 15*

* :This condition may be abolished in the future.

68RST- (Input, Active-low)

68RST- is a reset signal which is inputted from the mechanical controller to the D8801.

Memory Address MADR0-MADR9 (10 lines: Output, Active-high)

MADR0-MADR9 are sent from the D8801 to pins MA0-MA9 of the 512K-byte resident D-RAM.

Memory Data Bus MD0-MD15 (16 lines: Output, Active-high)

MD0-MD15 are sent from the D8801 to the DIN (Data In) pins of the 512K-byte resident D-RAM and to the DIN (Data In) pins of the optional memory module D-RAM through CN2, CN5, CN9, and CN11.

Row/Column Address Strobe Signals RAS0/CAS0 (8 lines/1 line: Output, Active-low)

RAS0/CAS0 are sent from the D8801 to the RAS/CAS pins of the D-RAM. These signals are signal lines to specify the row/column address of the D-RAM. They manage the D-RAM in combination with MADR0-MADR9 (D-RAM refresh control).

Write Enable MWEL-, MWEH- (One line each: Output, Active-low)

MWEL-/MWEH- is sent from the D8801 to the WEO (data in) pin of the 512K-byte resident D-RAM and to the WE pin of the memory module through CN2, CN5, CN9, and CN11. MWEL- is a write enable signal for the low order byte, and MWEH- a write enable signal for the high order byte.

MOE- (One line: Output, Active-low)

MOE- is sent from the D8801 to the DE0 pin of the 512K-byte resident D-RAM and to the DE pin of the optional memory module through CN2, CN5, CN9, and CN11. MOE- goes low when the processor (MC68000) reads data from the D-RAM. Data output from the D-RAM is put onto the data bus and loaded into the processor (MC68000).

PAL, CPU Signals

Pin No.	Signal Name	Full Name of Signal	I/O	Logic Polarity	Remarks
5, 4, 3, 2, 1, 64, 63, 62, 61, 60, 59, 58, 57, 56, 55, 54	68D0 -68D15	68000 Data bus	I/O	H	Data bus
10	DTACK-	Data transfer acknowledge	I	L	Data transfer acknowledge
12	BGACK-	Bus grant acknowledge	I	L	Bus grant acknowledge
13	BR-	Bus request	I	L	Bus request
15	CPUCLK	CPU clock	I	H	CPU clock
17	HALT-	Halt	I/O	L	Halt
18	68RST-	68000 Reset input	I/O	L	Reset input
23, 24, 25	IPL2 -IPL0	Interrupt control	I	H	Interrupt control signals
21	VPA-	Valid peripheral address	I	L	Valid peripheral address
29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52,	68A1 -68A23	68000 Address bus	O	H	Address bus
6	AS-	Address strobe	O	L	Address strobe
7	UDS-	Upper data strobe	O	L	Upper data strobe
8	LDS-	Lower data strobe	O	L	Lower data strobe
9	68R/W-	68000 Read/ write	O	L	Read write signals
26, 27, 28,	FC2 -FC0	Function Code	O	H	Processor status
11	BG-	Bus grant	O	L	Bus grant

D-RAM Signals

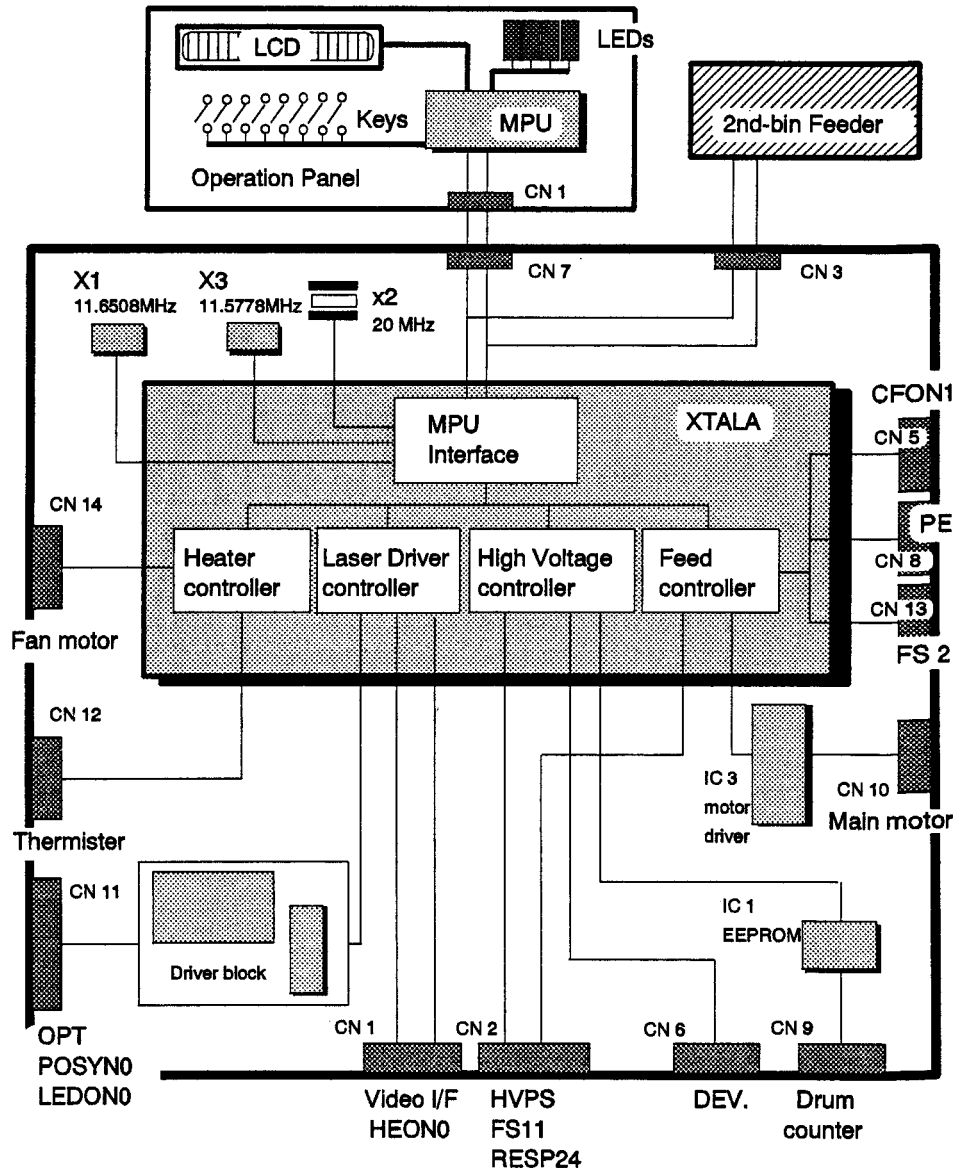
IC29

Pin No.	Signal Name	Full Name of Signal	I/O	Logic Polarity	Remarks
3, 5, 7, 9, 12, 14, 16, 18	MA7 -MA0	Memory address	O	H	Memory address

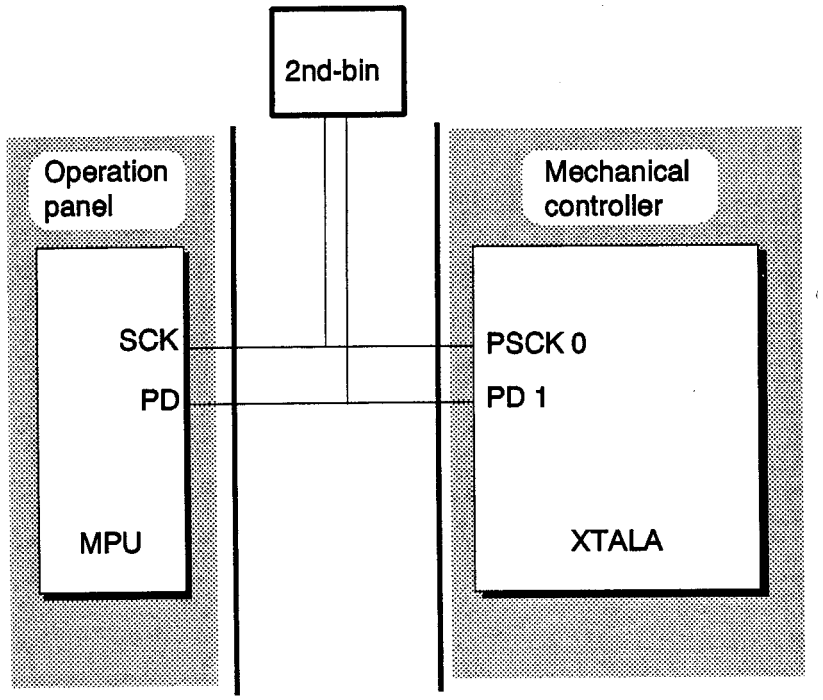
IC28

Pin No.	Signal Name	Full Name of Signal	I/O	Logic Polarity	Remarks
3	RAMCOFG	RAM configuration	I	H	RAM configuration
5	WEH-	Write enable Higher	O	L	Higher byte write enable signal
7	WEL-	Write enable Lower	O	L	Lower byte write enable signal
9	CASH-	Column address strobe Higher	O	L	Higher byte column address strobe signals
12	CASL-	Column address strobe Lower	O	L	Lower byte column address strobe signals
14	OE-	Output enable	O	L	Output enable
16, 18	MA9, MA8	Memory address	O	H	Memory address

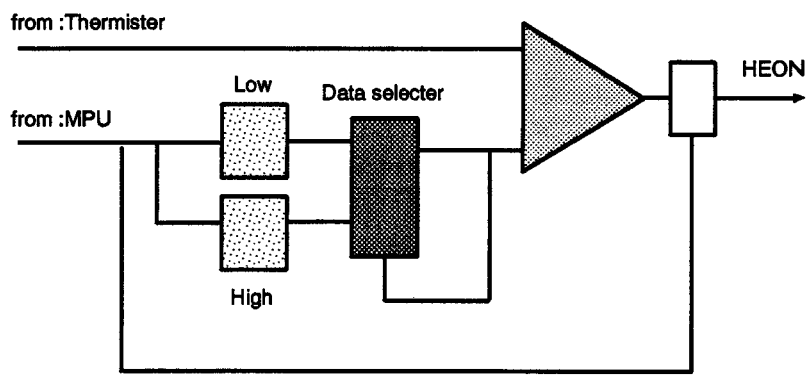
Mechanical Controller Section



The mechanical sections of this printer are controlled by the mechanical controller and the operation panel controller. IC1 (MPU) in the operation panel and IC4 (XTALA) in the mechanical controller perform all mechanical control from communicating data with the main controller to print-out. The MPU communicates with the XTALA in serial communication mode, in which the data at the start of transmission is compared with the data at the end of transmission to check for transmission errors.



The XTALA generates data to control the laser diode, motors, and heater unit according to the data sent form the main controller through the video interface. Such control data is sent to the respective sections for operation control, with the output timing generated inside the XTALA. The switches, LCD, and LEDs on the operation panel are also controlled by the MPU according to the timing from the XTALA.
The status signals (analog data) of the sensors located in the mechanical sections is read by the XTALA and converted to internal processing data (digital data) for storage in it. Laser data and various kinds of high voltage data (analog data) are also read by the XTALA and converted to internal processing data. Instead of being stored in the XTALA as digital data, such data is converted to internal processing data according to the request from the main controller.
Timing inside the XTALA is generated by internally dividing the 20MHz clock sent from the X-talZ.
For controlling the heater temperature, two kinds of control signals generated inside the XTALA are used as reference voltages for high and low temperatures. Temperature sensing data from the thermister is compared with the high and low temperature reference voltages. Its output signal then becomes a heater ON/OFF signal for temperature control. The heater enable signal is sent to the main power supply through the high voltage power supply and turns on the heater control circuit for voltage supply.



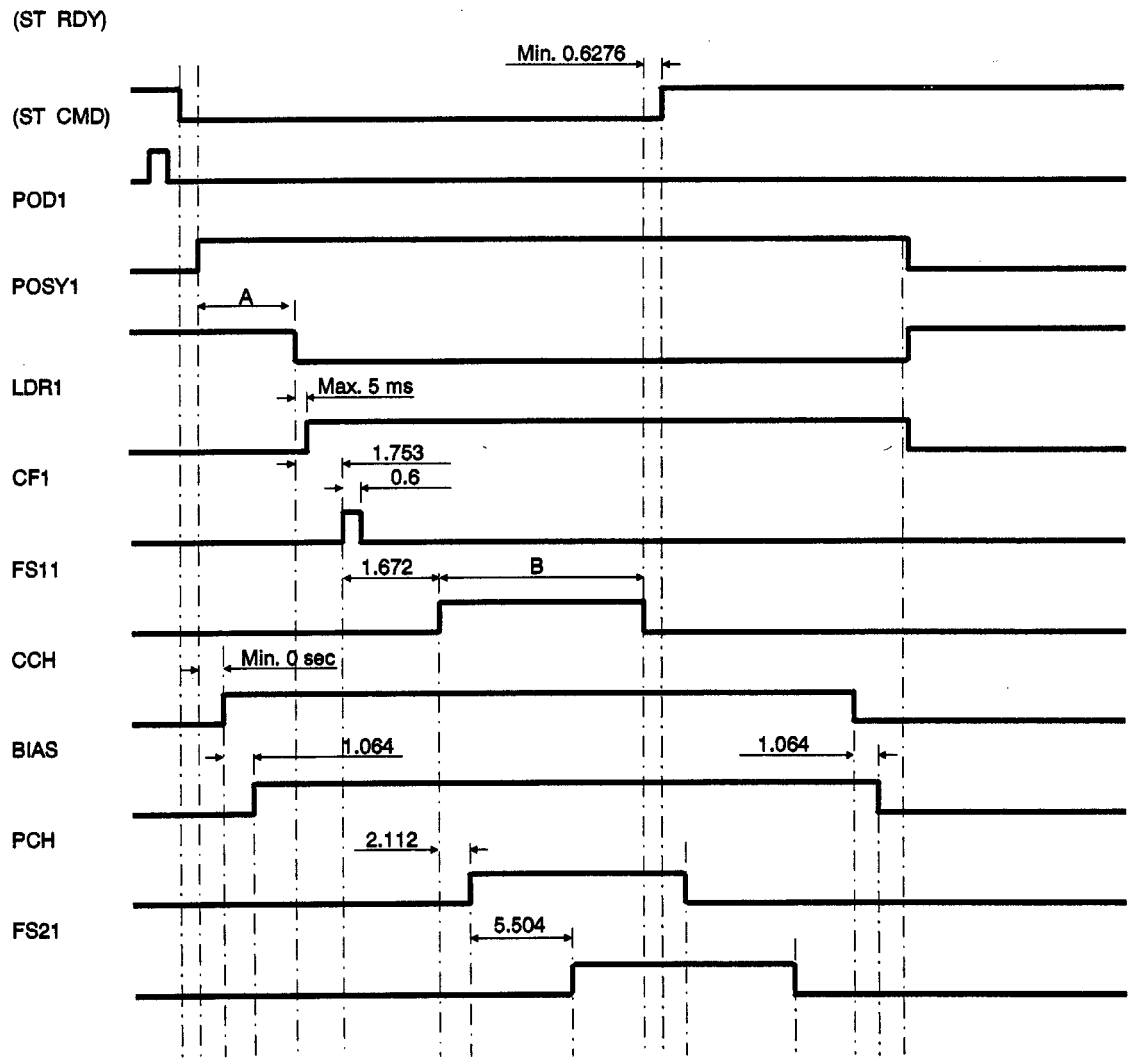
Voltage is supplied to each charger when the circuit in the high voltage power supply is turned on according to the enable signal from the XTALA.
A 4-phase stepping motor is used for the main motor. Phase control signals are outputted from the XTALA and sent to the main motor through IC3 (drive IC).

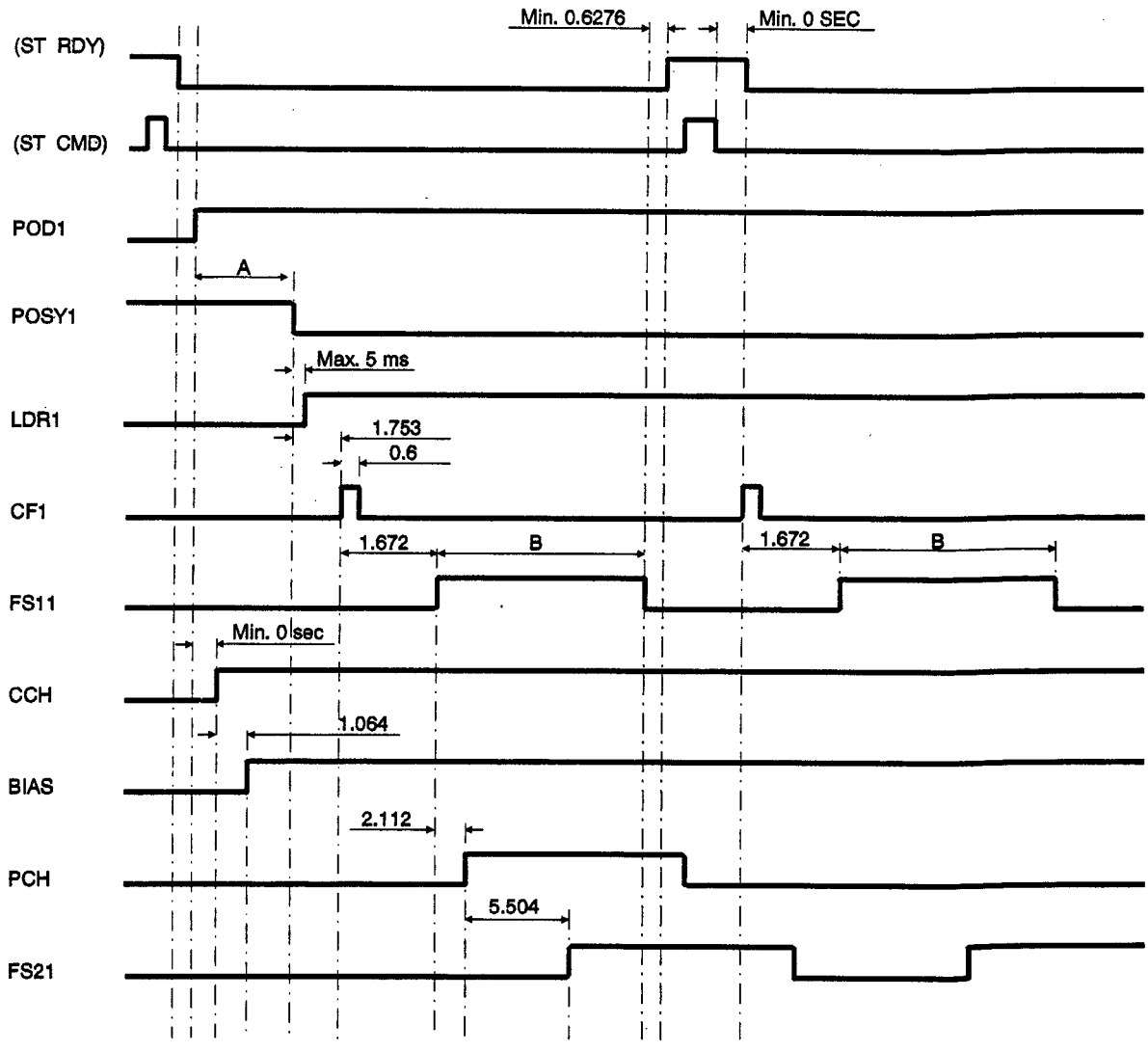
Pin.No	Pin.Name	Signal Name	I/O	Function & Interface
1	POSYN1	Polygon sync.	I	POLYGON SYNC Signal
2	UFE1	User field enable	I	User field enable signal
3	VSS1	VSS	I	GND
4	STS0	Status 0	O	UART Transmit Data
5	CMD0	Command 0	I	UART Recieve Data
6	READY1	Ready 1	O	UART Transmit Ready Signal
7	FS21	Feed sensor 2 1	I	Feed Sensor 2
8	CRDY1	Command ready1	O	UART Receive Ready Signal
9	PSYNC1	Page sync. 1	O	Video interface signal
10	LSYNC1	Line sync. 1	O	Video interface signal
11	VSS2	VSS2	I	GND
12	PCLK1	Printer clock 1	O	Video interface signal
13	VSS3	VSS3	I	GND
14	VDATA1	Video data 1	I	Video data signal
15	VSS4	VSS4	I	GND
16	VDD1	VDD 1	I	VCC
17	CCLK1	Controller clock 1	I	Video interface signal
18	VSS5	VSS5	I	GND
19	ASVDD	Analog VDD	I	Analog VCC for A/D Converter
20	ASVSS	Analog VSS	I	Analog GND for A/D Converter
21	AINTE1	Analog in Toner empty	I	Analog Input (Toner Empty)
22	AINLM1	Analog in Laser power moniter	I	Analog Input (Laser Power)
23	AINDL1	Analog in Discharge lamp 1	I	Analog Input (Discharge Lamp)
24	AINTH1	Analog in Thermister 1	I	Analog Input (thermister)
25	AINFN1	Analog in Fan 1	I	Analog Input (FAN Lock Detect)
26	AINCC1	Analog in Corona Charge 1	I	Analog Input (CCH Voltage)
27	AINBI1	Analog in BIAS 1	I	Analog Input (BIAS Voltage)
28	AINPC1	Analog in Printer charge 1	I	Analog Input (PCH Voltage)
29	VRFL	Voltage reference Low	I	Low Ref V for A/D Converter
30	VRFH	Voltage reference High	I	High Ref V for A/D Converter
31	ADVDD	Analog VDD	I	Analog VCC for A/D Converter

32	ADVSS	AnalogVSS	I	Analog GND for A/D Converter
33	DAVSS	DigitalVSS	I	Analog GND for D/A Converter
34	DAVDD	DigitalVDD	I	Analog VCC for D/A Converter
35	FLP1	Fine Laser power 1	O	Fine Laser Power (Analog Out)
36	RLP1	Rough Laser Power 1	O	Rough Laser Power (Analog Out)
37	AVSS2	AnalogVSS2	I	Analog GND for D/A Converter
38	SRAL0	Serial 0	I	Parallel for Test mode
39	FDAT0	Feed motor Actine 0	I	FDA1-FDD1 active change bit
40	VSS6	VSS6	I	GND
41	VDD2	VDD2	I	VCC
42	CCCLK0	Corona charge clock 0	O	NPN Tr for HVPS
43	BICLK0	BIAS clock 0	O	NPN Tr for HVPS
44	PCCLK0	Print clock 0	O	NPN Tr for HVPS
45	VSS7	VSS7	I	GND
46	HEON1	Heater ON 1	O	Heater Lamp Drive
47	TSRES0	Test reset 0	I	ResetforTEST
48	RESRF0	Reset reference 0	I	ReferenceforRESET
49	FS11	Feed sensor 1	I	Feed Sensor 1
50	VSS8	VSS8	I	GND
51	V2CK1	Video 2 clock	I	80CHR Printing Clock
52	TSMD2	Test mode 2	I	TEST select input for the ADC test bus out
53	TEST0	Test 0	B	TESTInput/PORTOUTPUT
54	TEST1	Test 1	B	TESTInput/PORTOUTPUT
55	TEST2	Test 2	B	TESTInput/PORTOUTPUT
56	TEST3	Test 3	B	TESTInput/PORTOUTPUT
57	TEST4	Test 4	I	TEST Bus I/O select I/O=0:1
58	TSMD1	Test mode 1	I	Test Pin I/O select I/O=0:1
59	TSDB0	Test data bus 0	B	Data Bus for TEST
60	TSDB1	Test data bus 1	B	Data Bus for TEST
61	TSDB2	Test data bus 2	B	Data Bus for TEST
62	TSDB3	Test data bus 3	B	Data Bus for TEST

63	TSDB4	Test data bus 4	B	Data Bus for TEST
64	TSDB5	Test data bus 5	B	Data Bus for TEST
65	VDD3	VDD3	I	VCC
66	VSS9	VSS9	I	GND
67	M2CK00	20M clock 00	I	ADC/SYSTEM Clockin
68	M2CK11	20M clock 11	I	ADC/SYSTEM Clock in
69	VSS10	VSS10	I	GND
70	V1CK11	Video1 clock 11	I	Video Clock generater
71	V1CK00	Video1 clock 00	O	Video Clock generater
72	VSS11	VSS11	I	GND
73	TSDB6	Test data bus 6	B	Data Bus for TEST
74	TSDB7	Test data bus 7	B	Data Bus for TEST
75	MCON1	Mecha counter ON1	O	Nonresetable Countor Control
76	CFON1	Cassette feed ON1	O	Cassette Feed Control
77	TSIG1	Test signal bit	I	Test Signal for Accelrate Test mode
78	PSCK0	Peripheral serial clock 0	I	Communication Clock
79	PD1	Peripheral data 1	B	Communication Data
80	MGON1	Magnet motor on 1	O	MG Motor Drive Control
81	VSS12	VSS12	I	GND
82	PE1	Paper empty 1	I	Paper End Detect Sensor
83	E1D0	EP ROM Data 0	I	EEPROM Read Data
84	ESCK1	Erasable PROM clock1	O	EEPROM Read/Write Clock
85	ECS21	Erasable PROM chip select 2 1	O	EEPROM Chip Select 2
86	ECS11	Erasable PROM chip select 1 1	O	EEPROM Chip Select 1
87	PRE1	Protect enable1	O	Protect Resister Enable
88	CO0	Cover open 0	I	Cover Open Detect
89	FDD1	Feed motor phase D 1	O	Feed Motor Phase D Control
90	VSS13	VSS13	I	GND
91	VDD4	VDD4	I	VCC
92	FDC1	Feed motor phase C1	O	Feed Motor Phase C Control
93	FDB1	Feed motor phase B1	O	Feed Motor Phase B Control
94	FDA1	Feed motor phase A1	O	Feed Motor Phase A Control

95	FDON1	Fan/feed on 1	O	FAN/Feed Motor control
96	DCLED1	Discharge LED 1	O	Discharge Lamp Drive
97	POD1	Polygon drive 1	O	Polygon motor drive signal
98	VSS14	VSS14	I	GND
99	LD1	Laser drive 1	O	Laser drive signal
100	VSS15	VSS15	I	GND


(ST RDY)
Min. 0.6276
(ST CMD)
POD1
POSY1
A
LDR1
Max. 5 ms
1.753
CF1
0.6
FS11
1.672
B
CCH
Min. 0 sec
BIAS
1.064
1.064
PCH
2.112
FS21
5.504

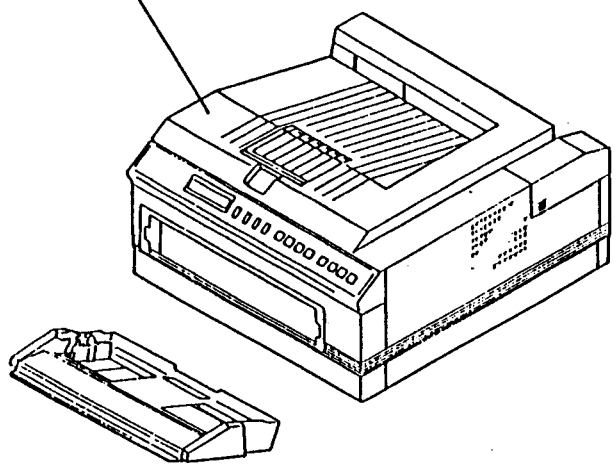

(ST RDY)
(ST CMD)
POD1
POSY1
LDR1
CF1
FS11
CCH
BIAS
PCH
FS21
Min. 0.6276
Min. 0 SEC
A
Max. 5 ms
1.753
0.6
1.672
B
1.672
B
Min. 0 sec
1.064
2.112
5.504

PARTS LIST NMS1474

PARTS LOCATION

1 COVER BLOCK

2 OPERATION PANEL BLOCK



3 BASE BLOCK(1)

4 BASE BLOCK(2)

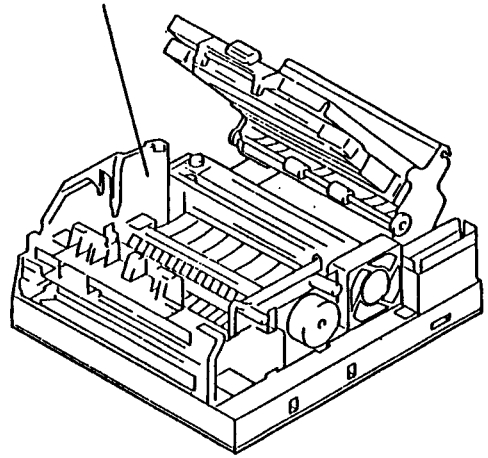
5 RIGHT FRAME BLOCK

6 LEFT FRAME BLOCK

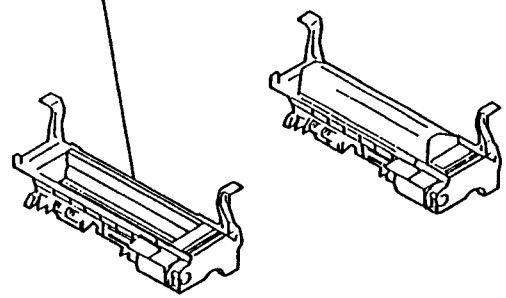
7 FAN MOTOR BLOCK

8 LASER SCANNER BLOCK

9 PAPER DISCHARGE BLOCK

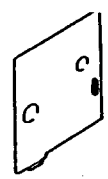


12 DEVELOPING BLOCK

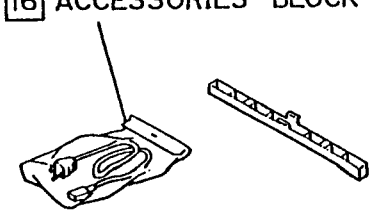


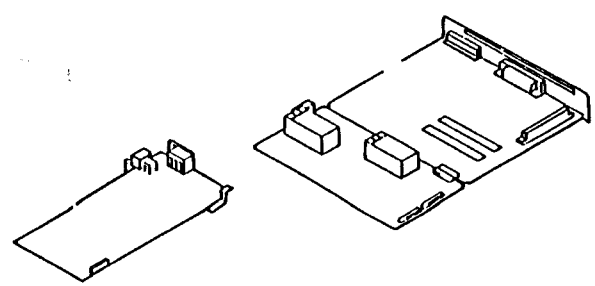
10 PCB,POWER SUPPLY BLOCK

11 POWER SUPPLY BLOCK

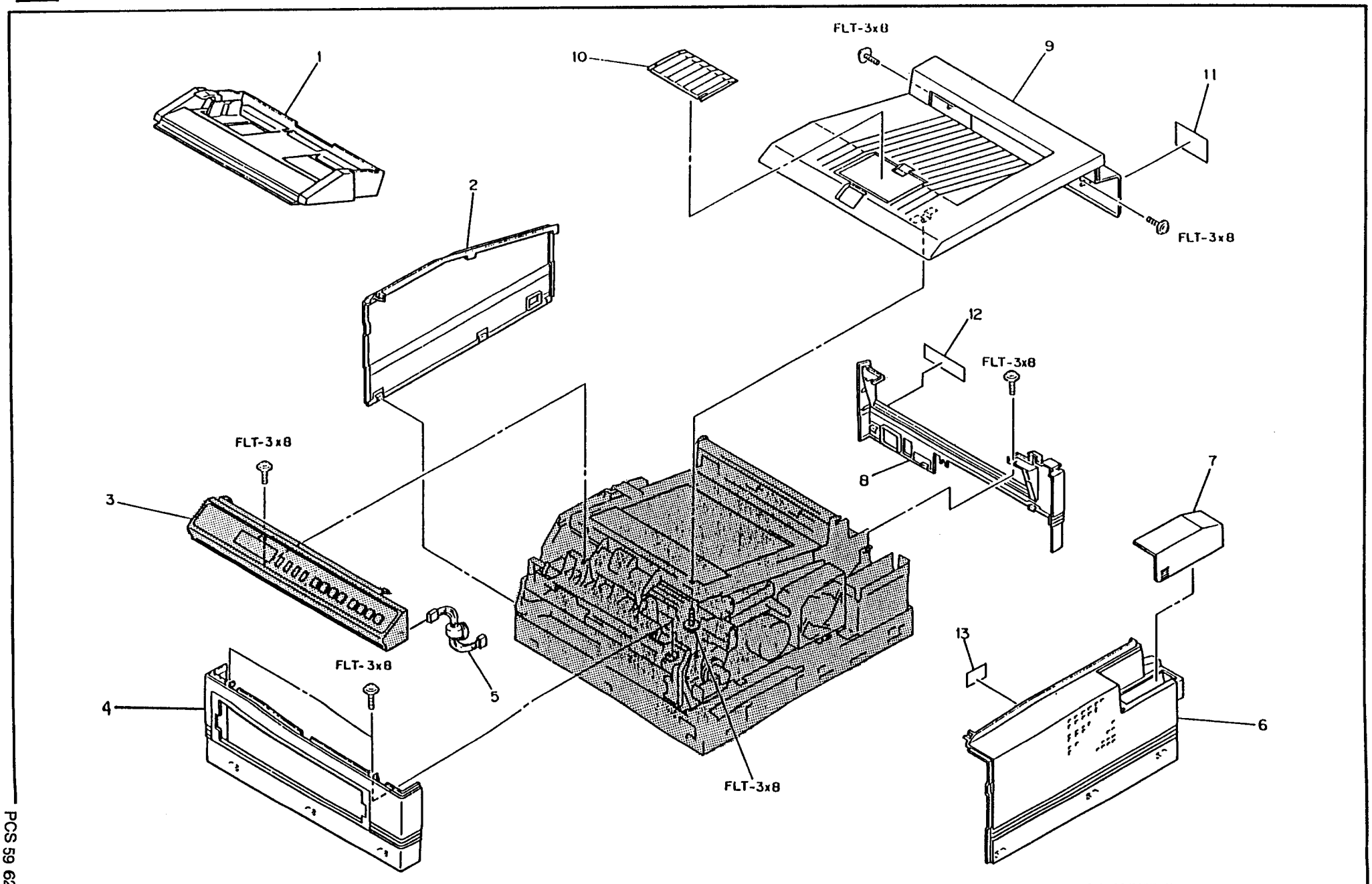


16 ACCESSORIES BLOCK





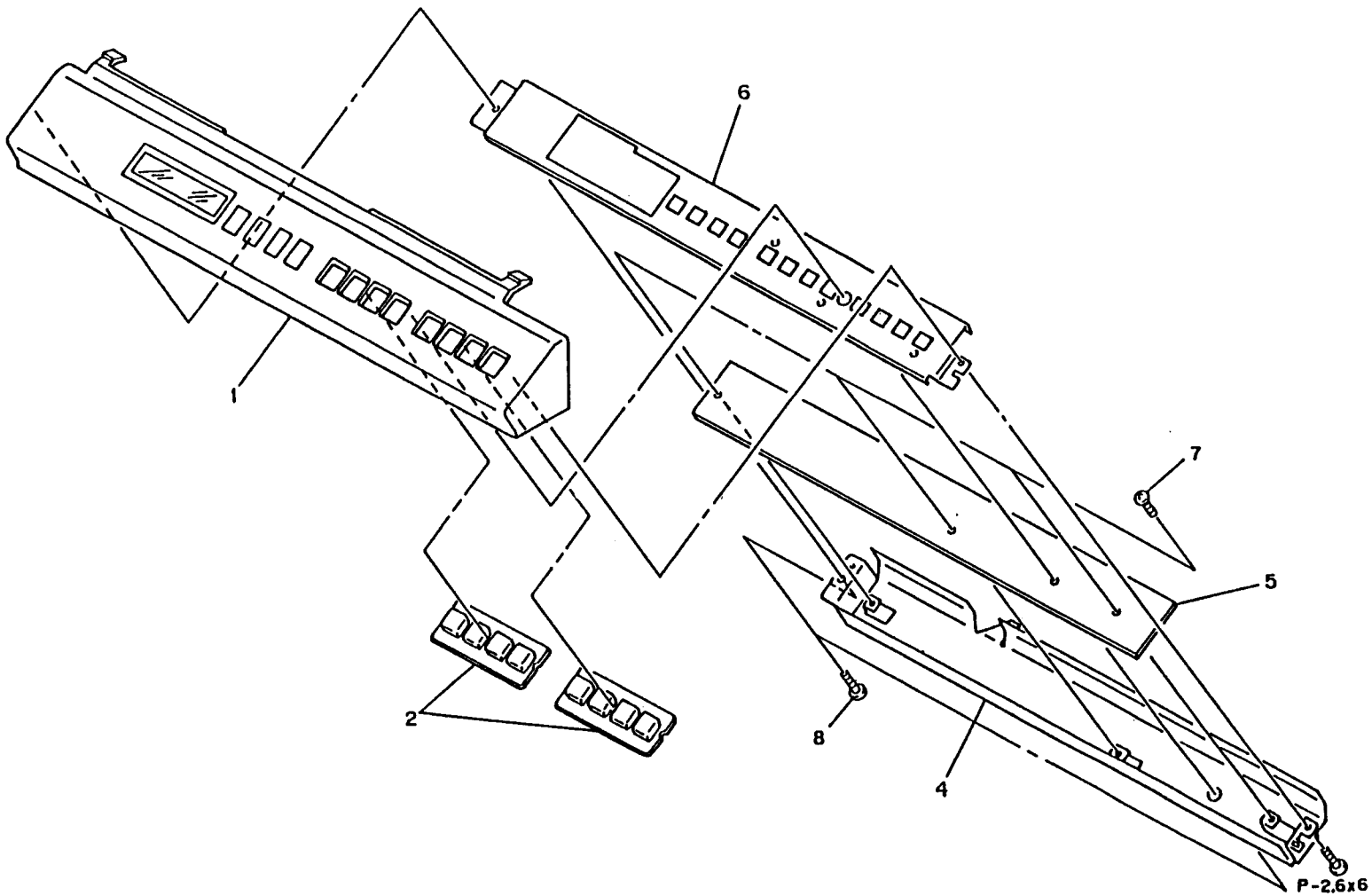
1 COVER BLOCK



1 COVER BLOCK

1-1	4822 693 91514	PAPER CASSETTE UNIT
1-2	4822 432 40157	SIDE COVER LEFT
1-3	4822 432 40145	OPERATION PANEL UNIT
1-4	4822 432 40159	FRONT COVER
1-6	4822 432 40156	SIDE COVER RIGHT
1-7	4822 432 40154	FONT CARTRIDGE COVER
1-8	4822 432 40158	REAR COVER 2
1-9	4822 432 40148	TOP COVER UNIT
1-10	4822 432 40149	LEGAL PAPER TRAY

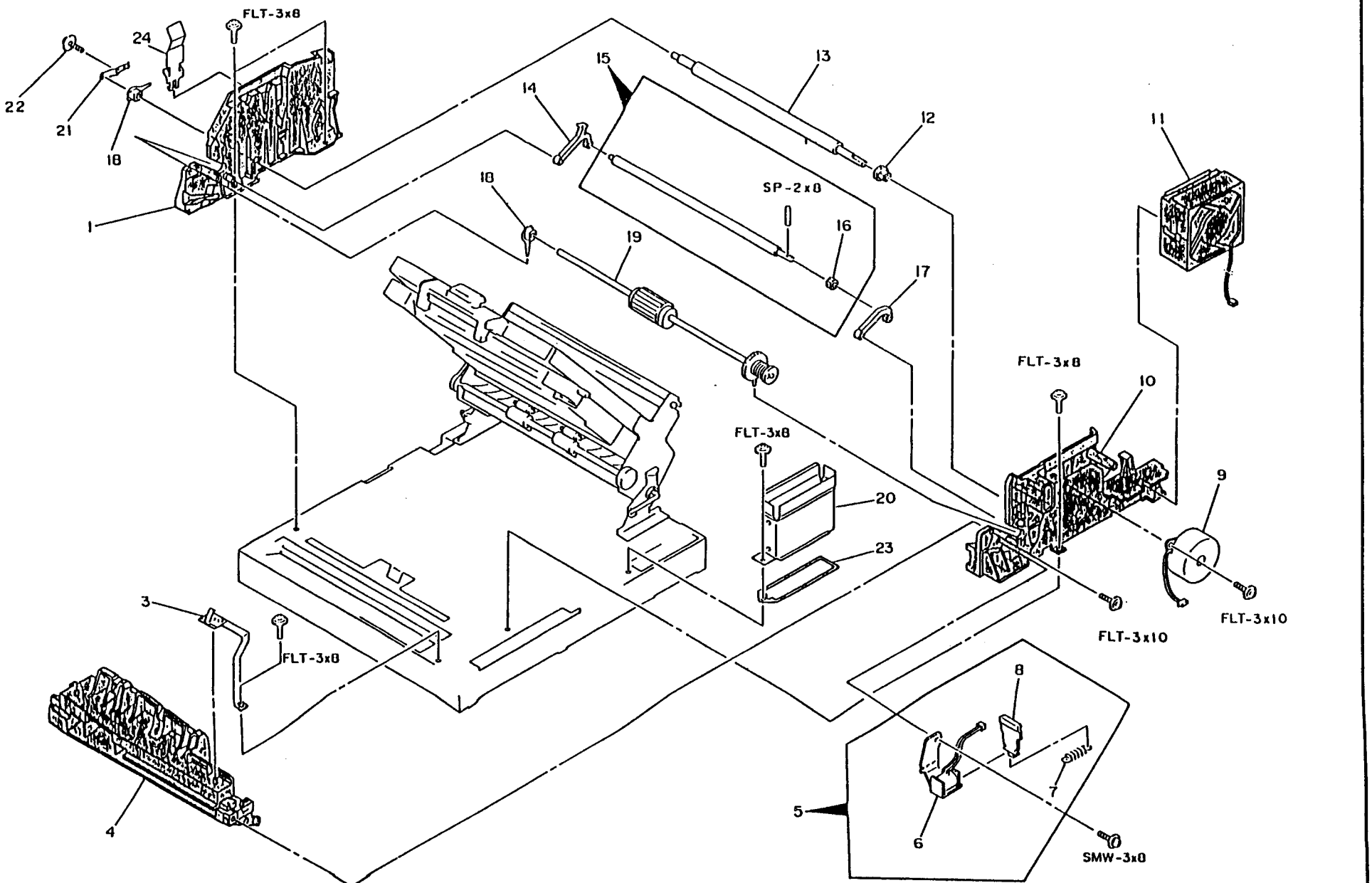
2 OPERATION PANEL BLOCK



2 OPERATION PANEL BLOCK

2-1	4822 276 80419	OPERATION PANEL SILK CK
2-5	4822 212 60101	OPERATION PANEL PC BOARD

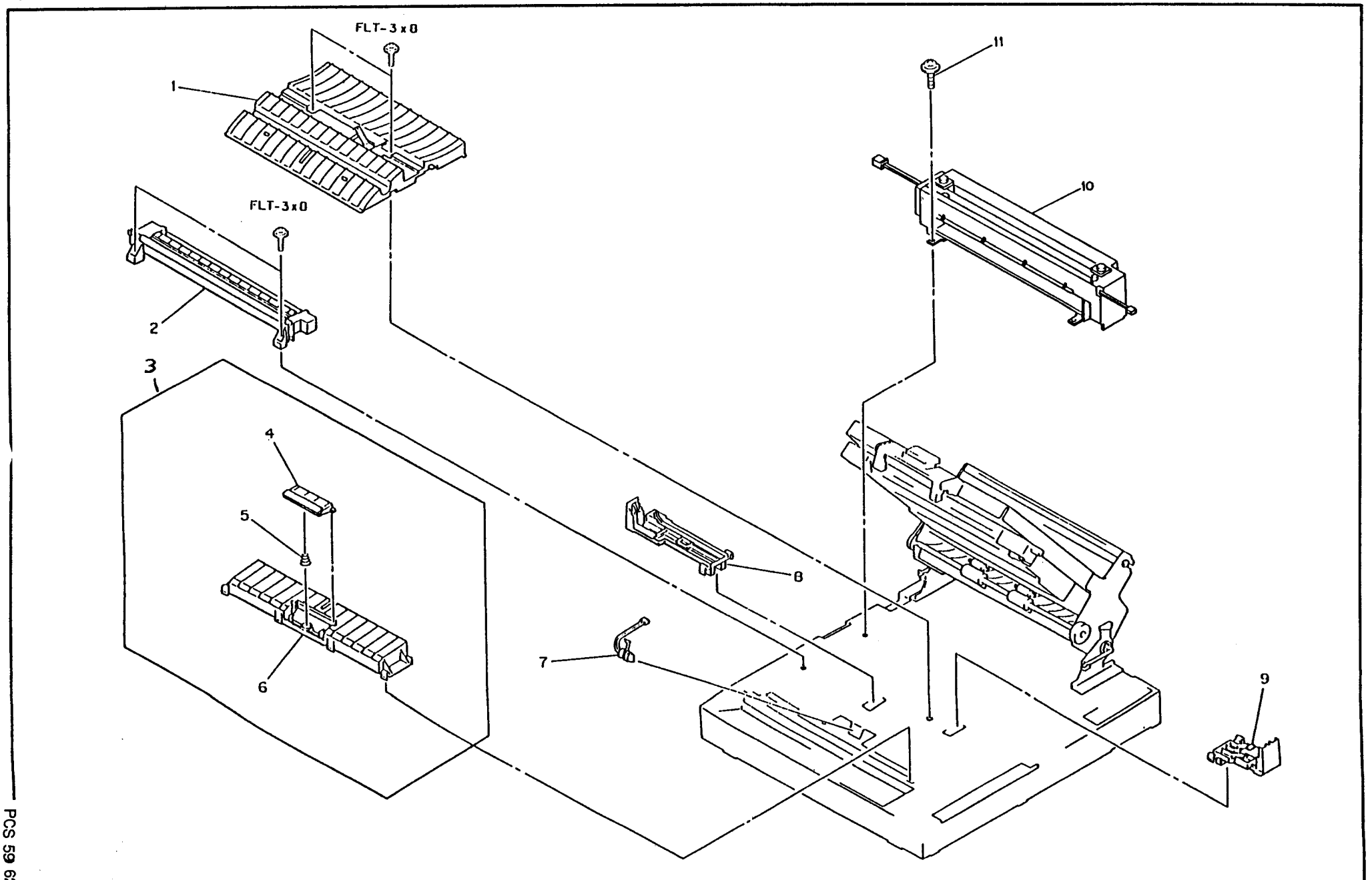
3 BASE BLOCK (1)



3 BASE BLOCK (1)

3-1	4822 693 91529	SIDE FRAME LEFT UNIT
3-4	4822 693 91531	FRONT STAY UNIT
3-6	4822 281 50168	CASSETTE FEED SOLENOID CK2
3-9	4822 361 21501	MAIN MOTOR
3-10	4822 693 91532	SIDE FRAME RIGHT UNIT
3-11	4822 361 10645	FAN MOTOR UNIT
3-12	4822 522 33241	PINCH ROLLER GEAR A
3-14	4822 404 60728	PINCH ROLLER ARM LEFT
3-16	4822 522 33242	PINCH ROLLER GEAR B
3-17	4822 404 60731	PINCH ROLLER ARM RIGHT
3-18	4822 532 21457	CASSETTE FEED BUSH
3-19	4822 528 90838	CASSETTE FEED ROLLER UNIT

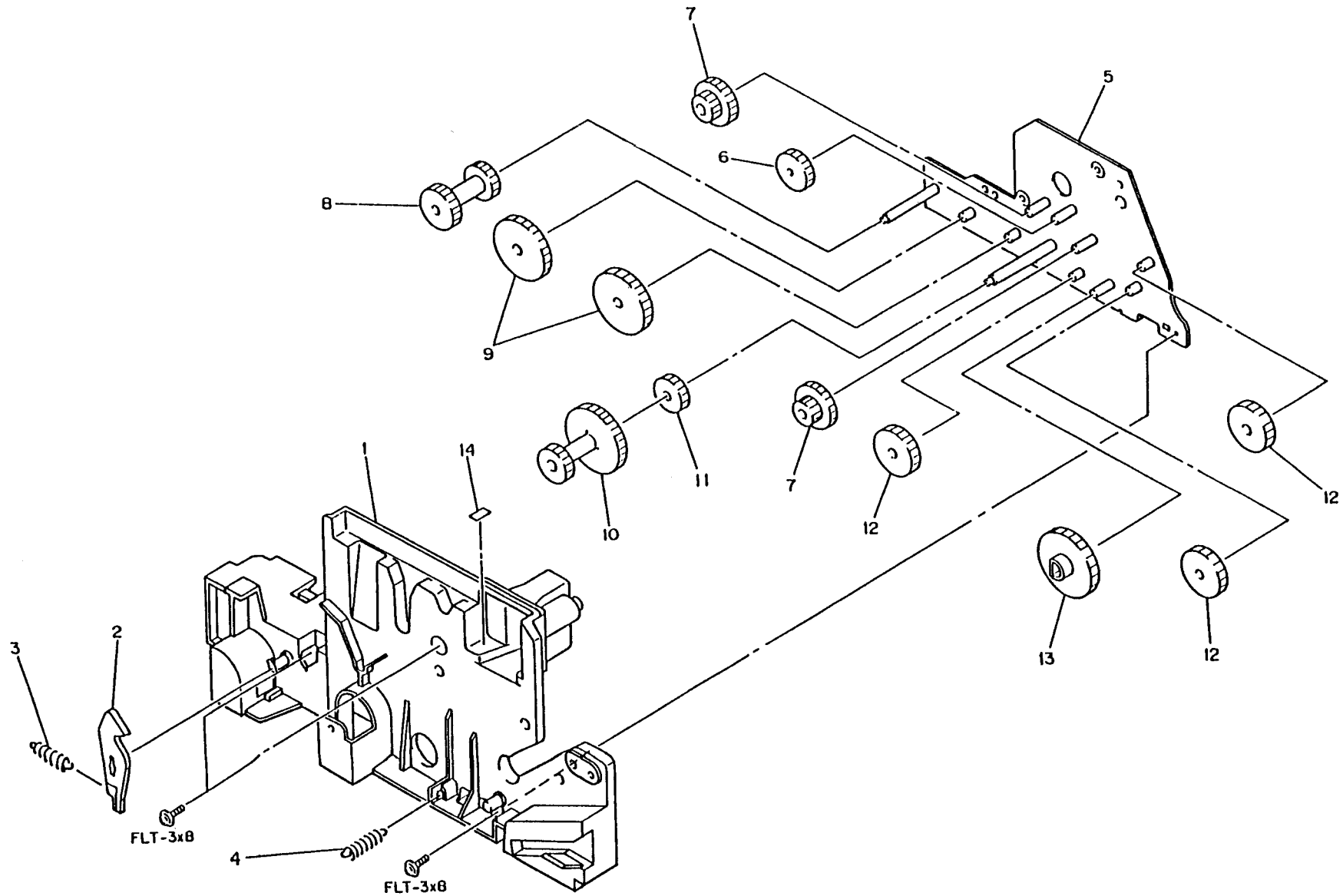
4 BASE BLOCK (2)



4 BASE BLOCK (2)

4-1	4822 432 40147	PAPER GUIDE UNIT
4-2	4822 693 91513	TRANSFER CHARGER UNIT
4-3	4822 432 40146	FRONT PAPER GUIDE UNIT
4-7	4822 219 82572	PAPER SENSOR
4-8	4822 212 60106	HIGH VOLTAGE LEFT UNIT
4-9	4822 212 60107	HIGH VOLTAGE RIGHT UNIT
4-10	4822 259 20413	HEATER UNIT

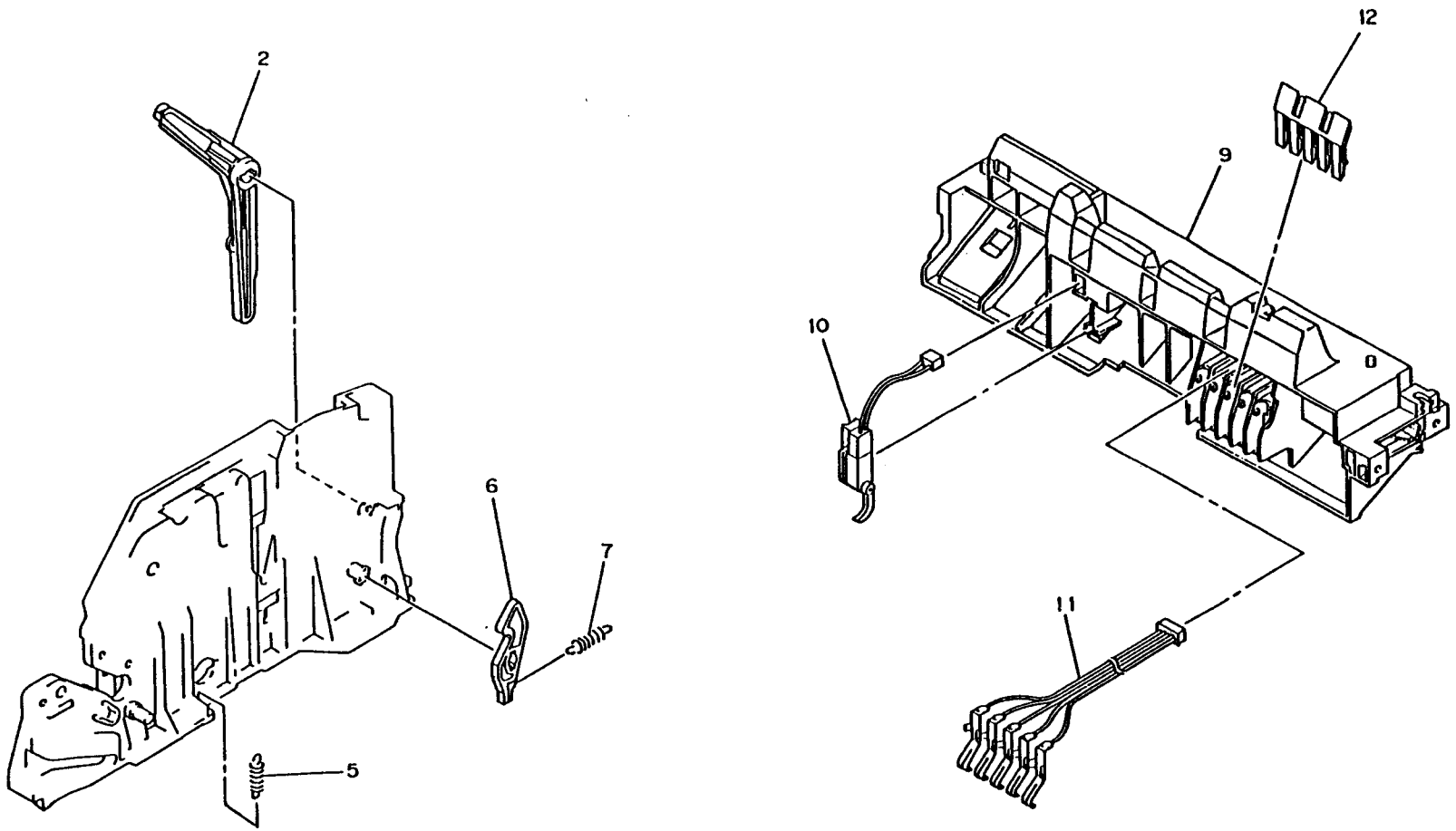
5 RIGHT FRAME BLOCK



5 RIGHT FRAME BLOCK

5-1	4822 464 90733	SIDE FRAME RIGHT CK
5-2	4822 404 60727	DRUM HOOK
5-6	4822 522 33239	REDUCTION GEAR B
5-7	4822 522 33238	REDUCTION GEAR A
5-8	4822 522 33232	HR DRIVE GEAR A
5-9	4822 522 33234	IDLE GEAR A
5-10	4822 522 33233	DRUM DRIVE GEAR
5-11	4822 522 33235	IDLE GEAR B
5-12	4822 522 33236	IDLE GEAR C
5-13	4822 522 33237	PAPER FEED ROLLER GEAR

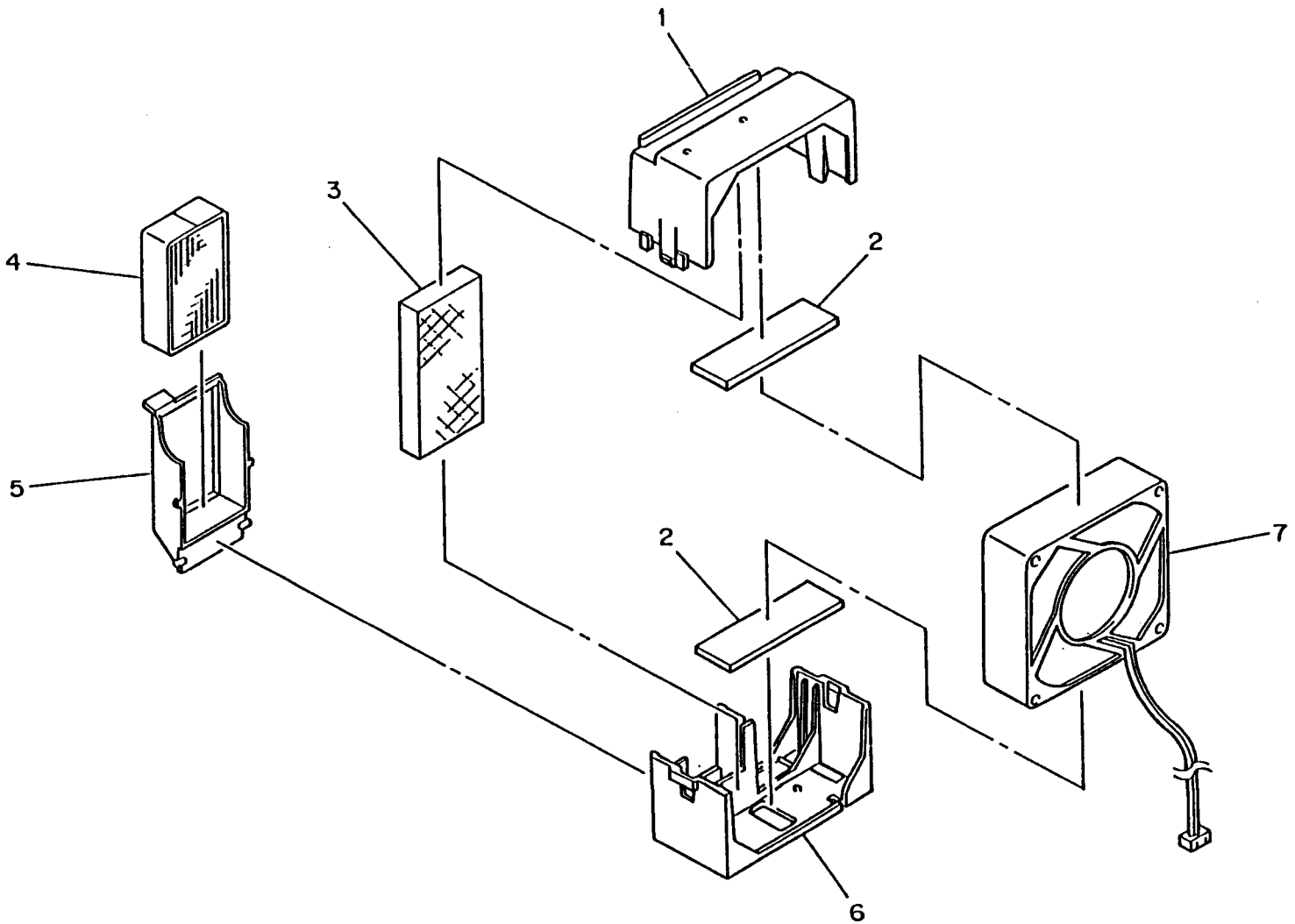
LEFT FRAME BLOCK



6 LEFT FRAME BLOCK

6-2	4822 404 60729	LEVER
6-6	4822 404 60727	DRUM HOOK
6-9	4822 693 91533	FRONT STAY
6-10	4822 219 82568	PAPER SENSOR
6-11	4822 290 81486	DEVELOPER TERMINAL
6-12	4822 432 40152	DEVELOPER TERMINAL COVER

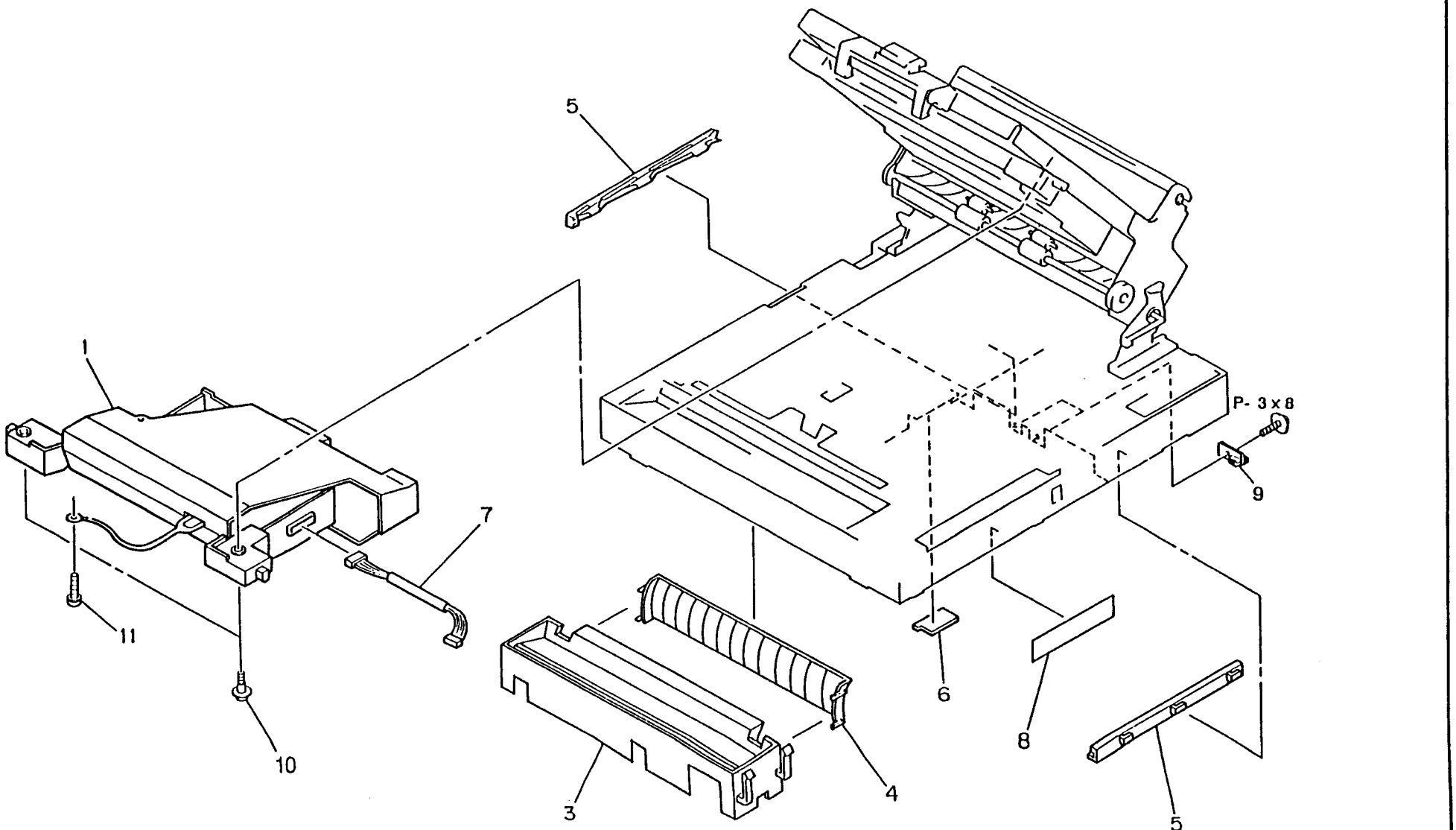
7 FAN MOTOR BLOCK



7 FAN MOTOR BLOCK

7-3	4822 480 40236	OZONE FILTER
7-4	4822 480 40235	OZONE FILTER B
7-7	4822 361 10627	FAN MOTOR

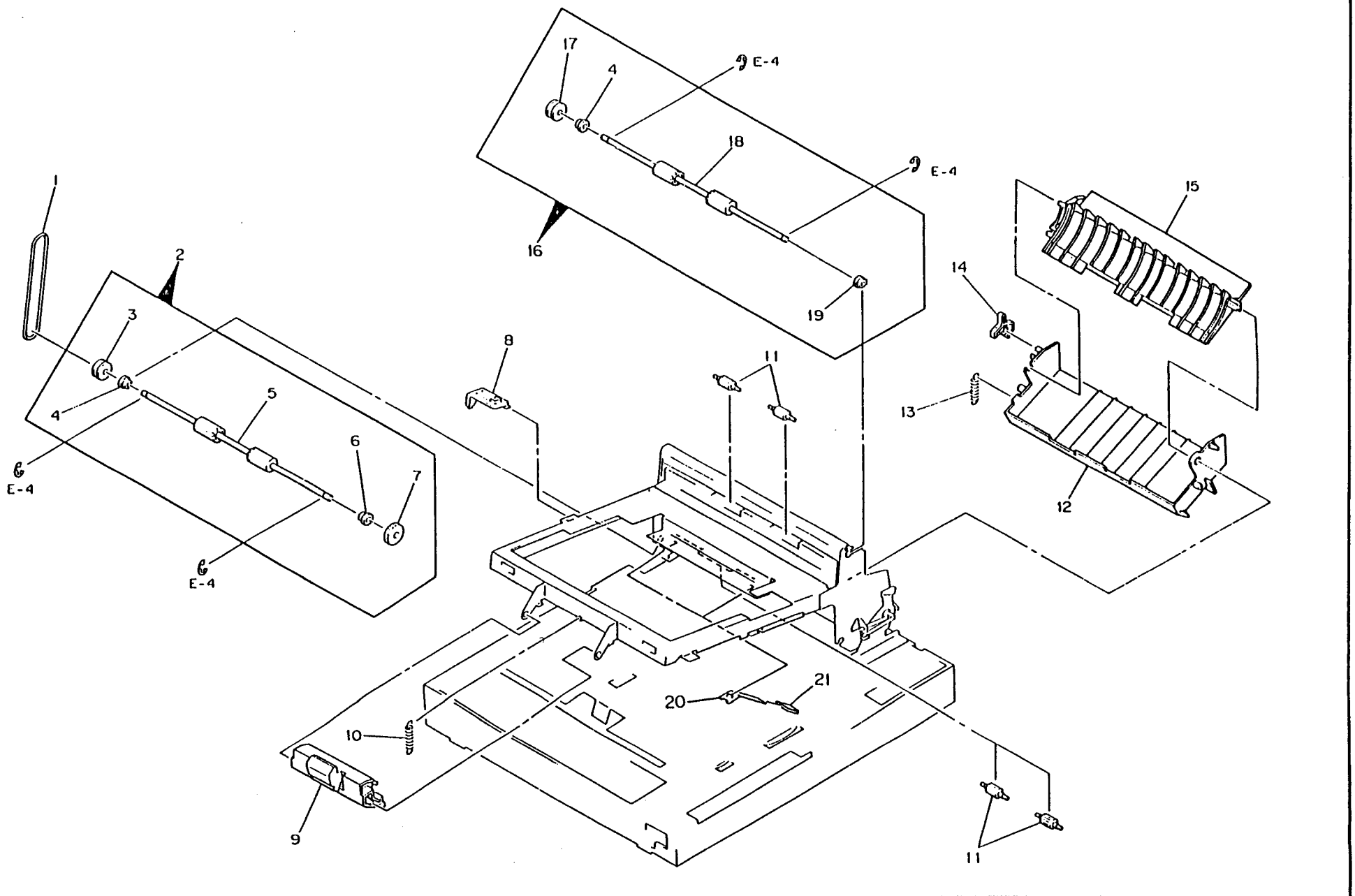
8 LASER SCANNER BLOCK



8 LASER SCANNER BLOCK

8-1	4822 212 60111	LO LASER SCANNER
8-3	4822 432 40161	2ND BIN PAPER GUIDE A
8-4	4822 432 40155	2ND BIN PAPER GUIDE B

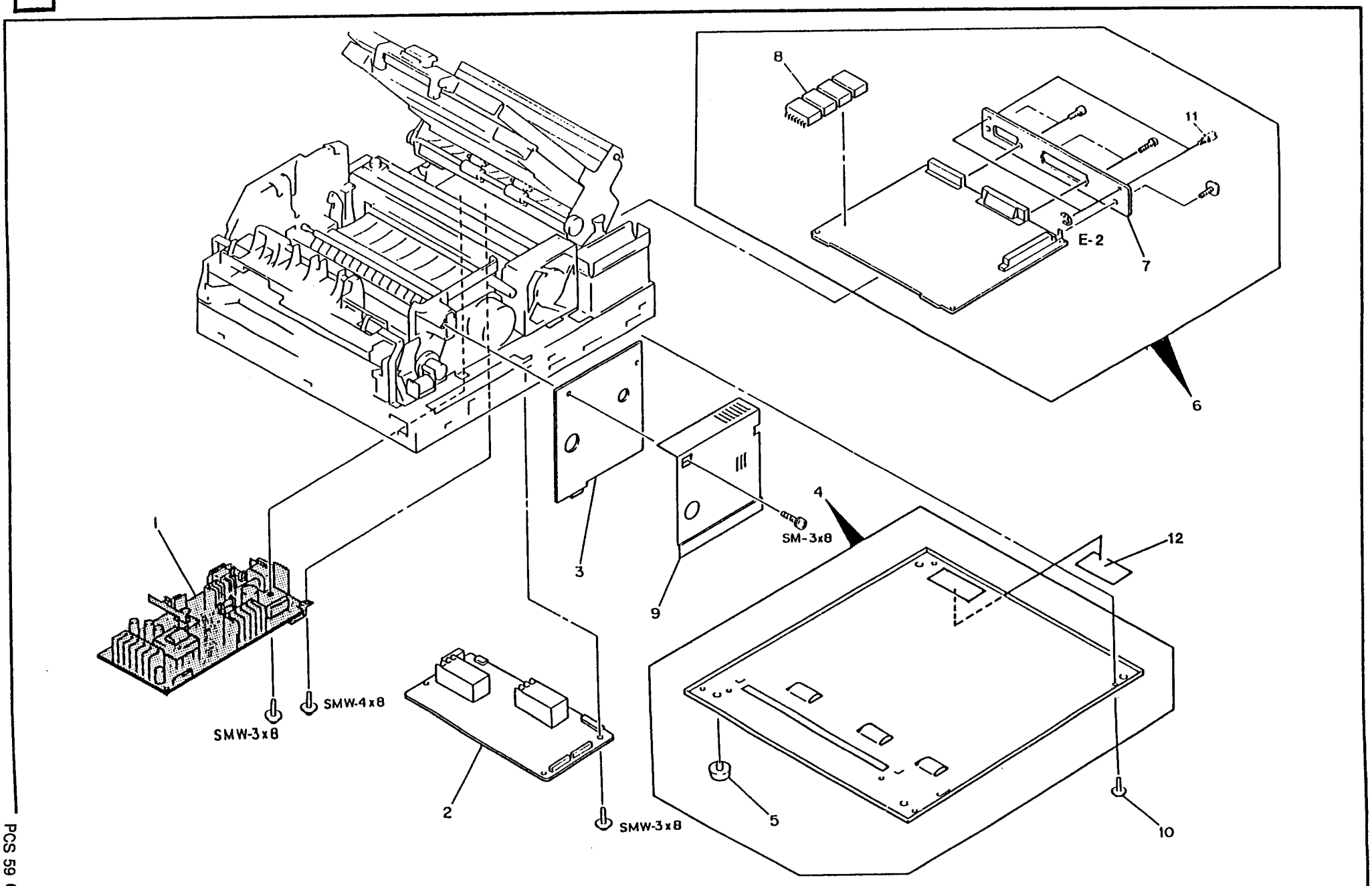
9 PAPER DISCHARGE BLOCK



9 PAPER DISCHARGE BLOCK

9-1	4822 358 31183	DISCHARGE ROLLER BELT
9-2	4822 528 90839	EXIR ROLLER A UNIT
9-8	4822 432 40151	COVER OPEN SWITCH BAR
9-9	4822 432 40153	OPENING HOOK
9-11	4822 528 70786	D.P. ROLLER
9-12	4822 432 40162	FACE UP TRAY
9-14	4822 404 60732	SELECT LEVER
9-15	4822 432 40163	SEPERATE FLAP
9-16	4822 528 90841	EXIR ROLLER B UNIT

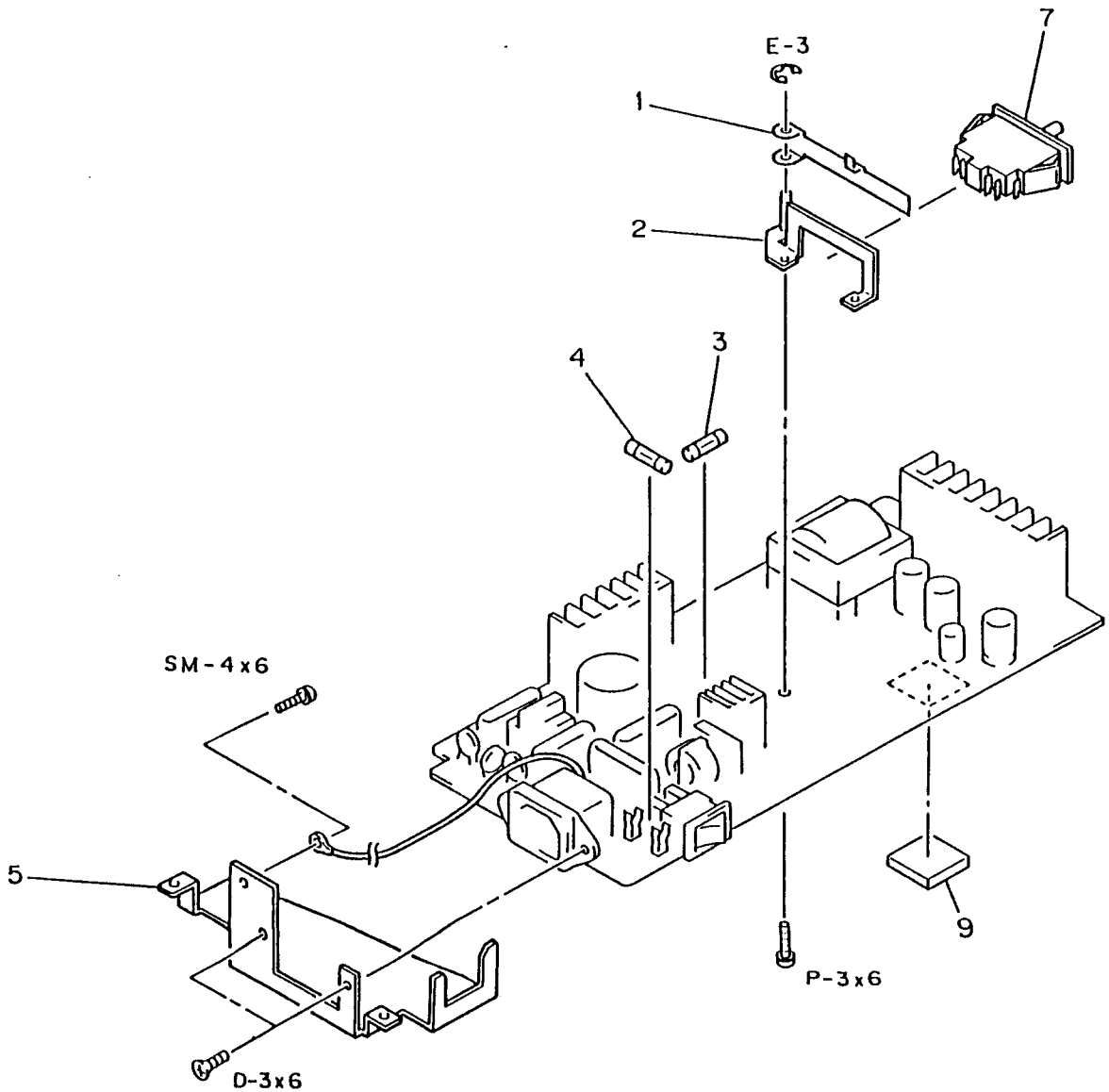
10 PCB, POWER SUPPLY BLOCK



10 PCB, POWER SUPPLY BLOCK

10-1	4822 212 60108	POWER SUPPLY UNIT
10-2	4822 212 60102	HIGH VOLTAGE POWER SUPPLY
10-3	4822 212 60103	MECHANICAL CONTROLLER BOARD
10-6	4822 212 60109	MAIN CONTROLLER PCB

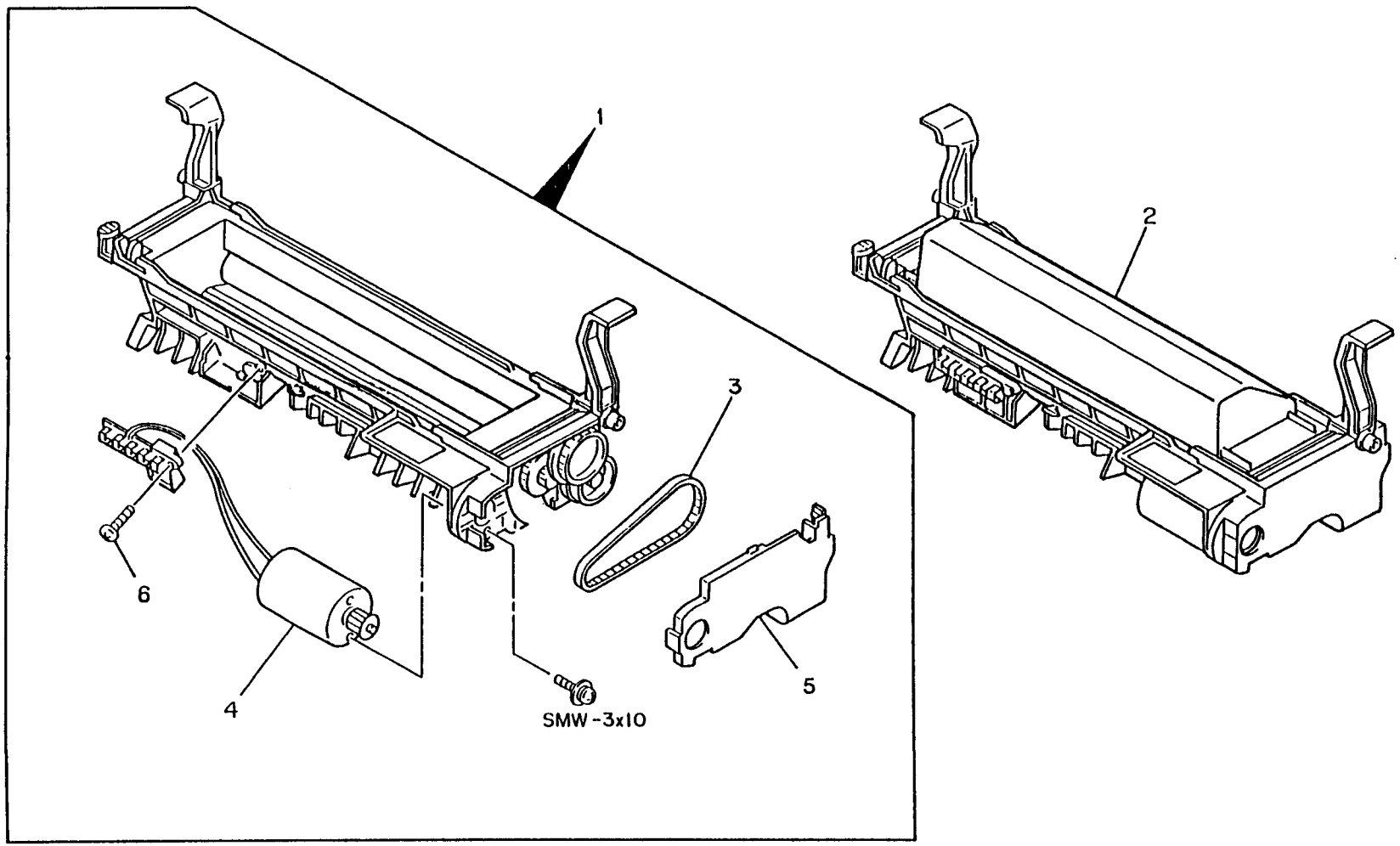
11 POWER SUPPLY BLOCK



11 POWER SUPPLY BLOCK

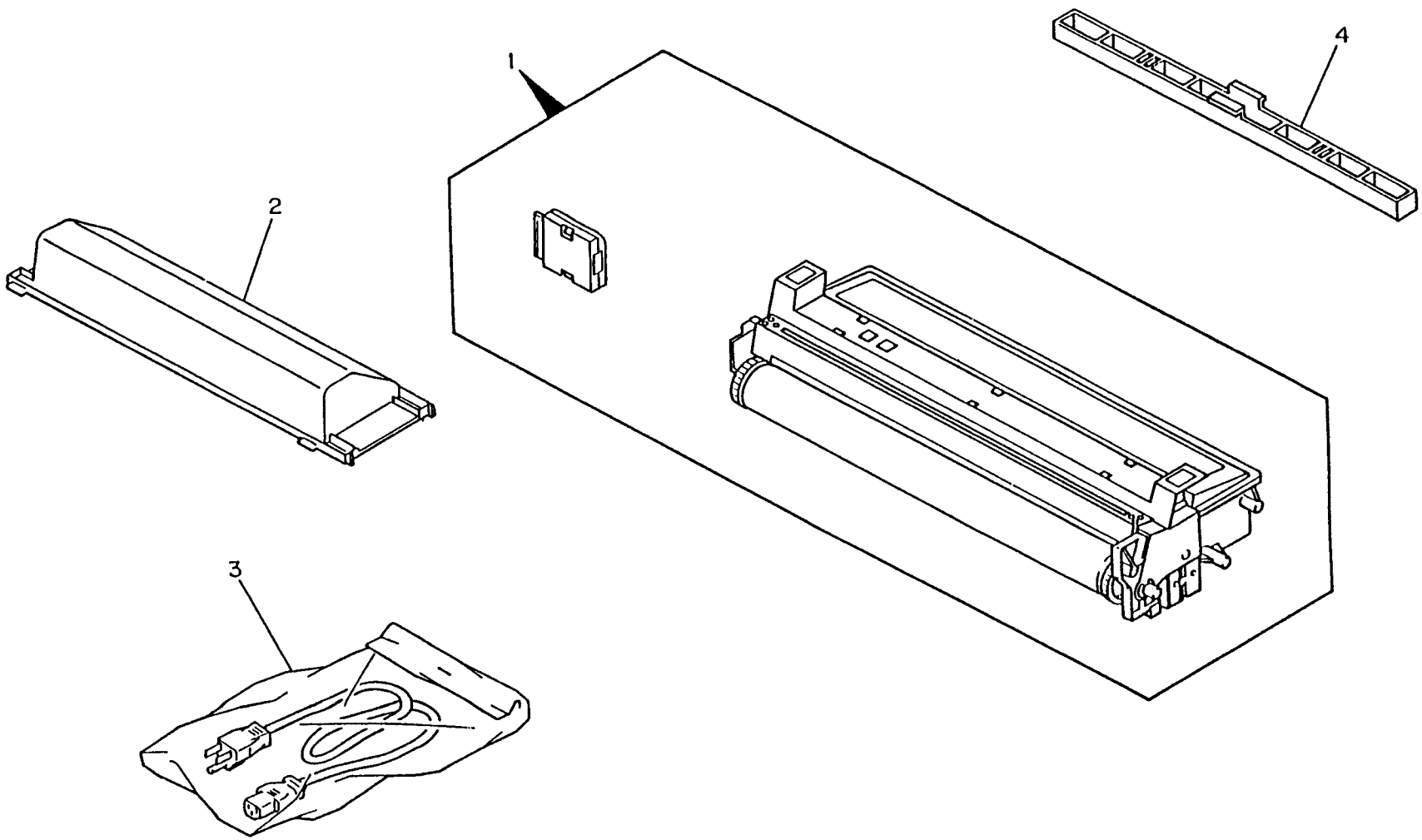
11-7	4822 276 13255	SWITCH

12 DEVELOPING BLOCK



12 DEVELOPING BLOCK

12-2	4822 693 91515	DEVELOPER UNIT WITH TONER
12-3	4822 358 31176	SYNCHRONE BELT
12-4	4822 219 82571	TONER SENSOR CK

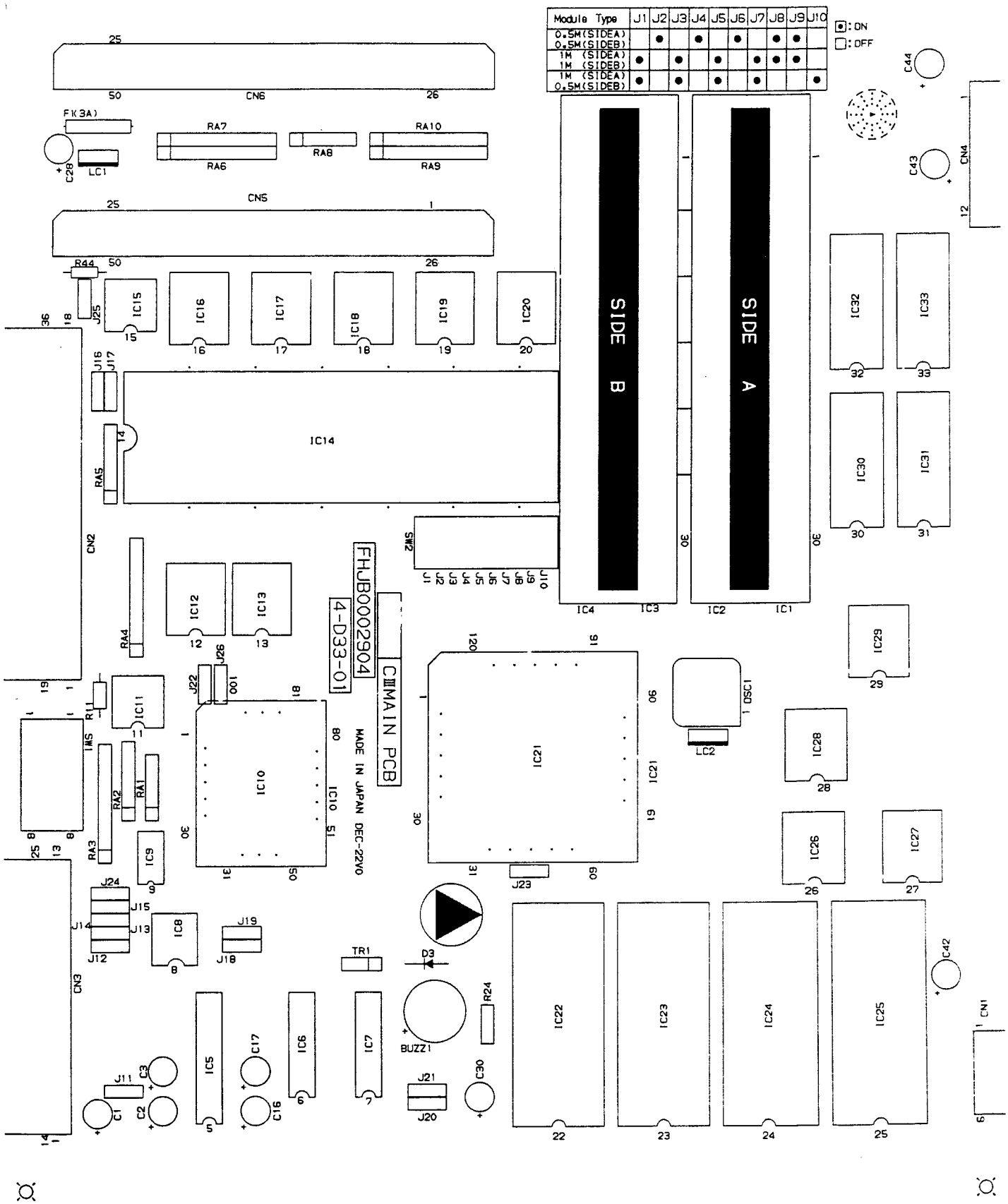

1
2
3
4

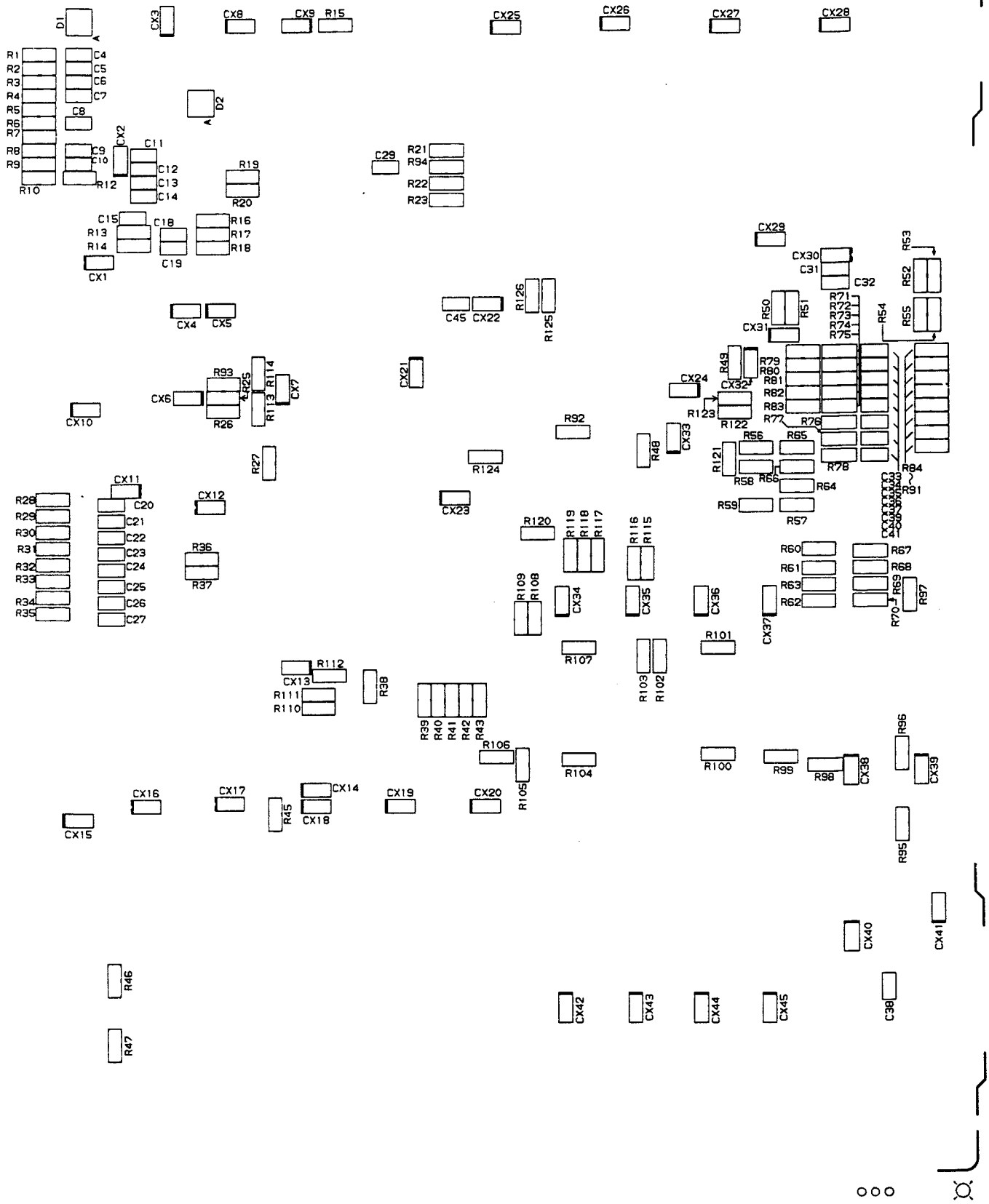
16 ACCESSORIES BLOCK

16-2	**4822 390 80167**	**INITIAL TONER**

VARIOUS

	4822 736 52871	USER'S REFERENCE MANUAL
	4822 736 52869	INSTRUCTION MANUAL
	4822 736 52872	REFERENCE GUIDE
SDC	4822 209 31236	SERVICE DRUM COUNTER


Module Type
J1 J2 J3 J4 J5 J6 J7 J8 J9 J10
0.5M(SIDEA) 0.5M(SIDEB)
1M (SIDEA) 1M (SIDEB)
1M (SIDEA) 0.5M(SIDEB)
: ON
: OFF
SIDE B
SIDE A
CN6
CN5
CN4
CN3
CN2
CN1
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
IC10
IC11
IC12
IC13
IC14
IC15
IC16
IC17
IC18
IC19
IC20
IC21
IC22
IC23
IC24
IC25
IC26
IC27
IC28
IC29
IC30
IC31
IC32
IC33
FHJB0002904
4-D33-01
C-MAIN PCB
MADE IN JAPAN DEC-22V0
BUZZ1
TR1
D3
LC1
LC2
OSC1
SW2


D1
CX3
CX8
CX9
R15
CX25
CX26
CX27
CX28
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
C4
C5
C6
C7
C8
D2
CX2
C9
C10
C11
R12
C12
C13
C14
R19
R20
C29
R21
R94
R22
R23
C15
C18
R13
R14
R16
R17
R18
CX1
C19
CX4
CX5
C45
CX22
R126
R125
CX29
CX30
C31
C32
R53
R52
R50
R51
CX31
R71
R72
R73
R74
R75
R54
R55
CX21
R93
R25
R114
R113
CX7
CX6
R26
CX10
R49
R79
R80
R81
R82
R83
R77
R76
CX24
CX32
R123
R122
R92
CX33
R48
R56
R65
R121
R58
R66
R64
R78
R84
R91
R27
R124
R59
R57
CX23
CX11
C20
C21
C22
C23
C24
C25
C26
C27
R28
R29
R30
R31
R32
R33
R34
R35
CX12
R36
R37
R120
R119
R118
R117
R116
R115
R109
R108
CX34
CX35
CX36
CX37
R60
R61
R63
R62
R67
R68
R69
R97
R70
R101
R107
R103
R102
CX13
R112
R111
R110
R38
R39
R40
R41
R42
R43
R106
R105
R104
R100
R99
R98
CX38
R96
CX39
R95
CX16
CX17
CX14
CX18
R45
CX19
CX20
CX15
CX40
CX41
R46
R47
CX42
CX43
CX44
CX45
C38

PARTS OF MAIN CONTROLLER 4822 212 60109

CONNECTORS

CN1	4822 265 30972	CONNECTOR
CN2	4822 267 70323	CONNECTOR
CN3	4822 267 60325	CONNECTOR
CN4	4822 265 41219	CONNECTOR
CN6	4822 267 70322	CONNECTOR

DIP SWITCHES

DSW1	4822 277 11276	DIP SWITCH KSD08

INTEGRATED CIRCUIT'S

IC5	4822 209 31229	MC145407
IC6	4822 209 60906	TTL AM26LS31
IC7	4822 209 31234	TTL AM26LS32
IC9	4822 209 52244	ROM X2404
IC10	4822 209 31235	GATE ARRAY EC-A452
IC11	4822 209 61946	TTL SN74LS07NS
IC12	5322 209 86017	TTL SN74LS224NS
IC13	5322 209 86017	TTL SN74LS224NS
IC14	4822 209 31232	CPU TMP68000-10
IC15	4822 209 63595	TTL SN74LS04NS
IC16	5322 209 86017	TTL SN74LS224NS
IC17	5322 209 86017	TTL SN74LS224NS
IC18	5322 209 86017	TTL SN74LS224NS
IC19	5322 209 86017	TTL SN74LS224NS
IC20	5322 209 86017	TTL SN74LS224NS
IC21	4822 209 31231	D8801S
IC22	4822 209 52241	CG EVEN EC-A451
IC23/25	4822 900 10273	FIRMWARE V.... (EPROM'S)
IC24	4822 209 52239	CG ODD EC-A450
IC26	4822 209 31233	TTL SN74LS240NS
IC27	4822 209 31233	TTL SN74LS240NS
IC28	5322 209 86017	TTL SN74LS224NS
IC29	5322 209 86017	TTL SN74LS224NS
IC30	4822 209 62812	DYNAMIC RAM TC514256-10
IC31	4822 209 62812	DYNAMIC RAM TC514256-10
IC32	4822 209 62812	DYNAMIC RAM TC514256-10
IC33	4822 209 62812	DYNAMIC RAM TC514256-10

FILTERS

LC1	4822 153 70052	EMI FILTER
LC2	4822 153 70052	EMI FILTER

CRYSTAL

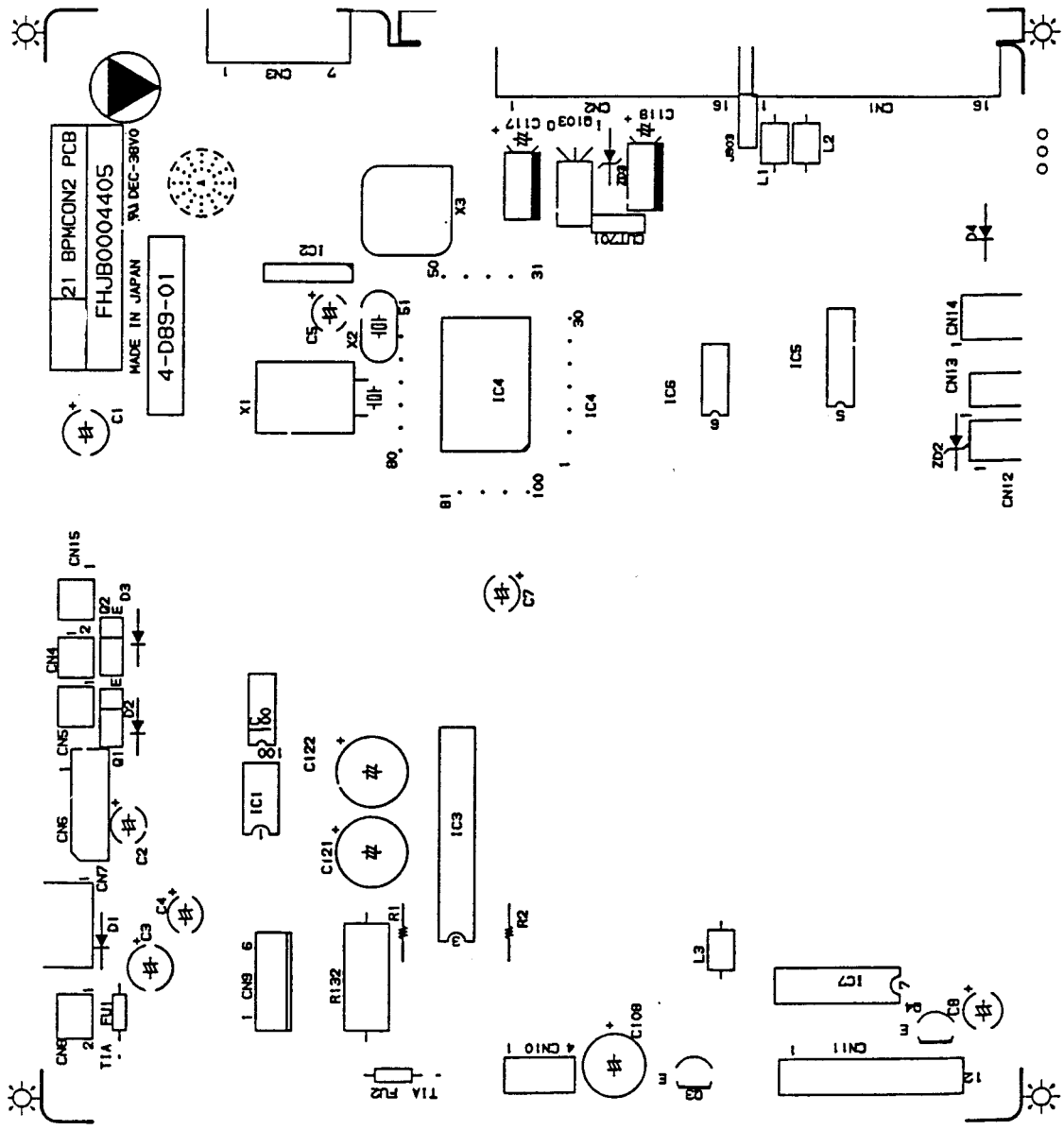
OSC1	4822 242 72541	CRYSTAL 19.6608 MHZ

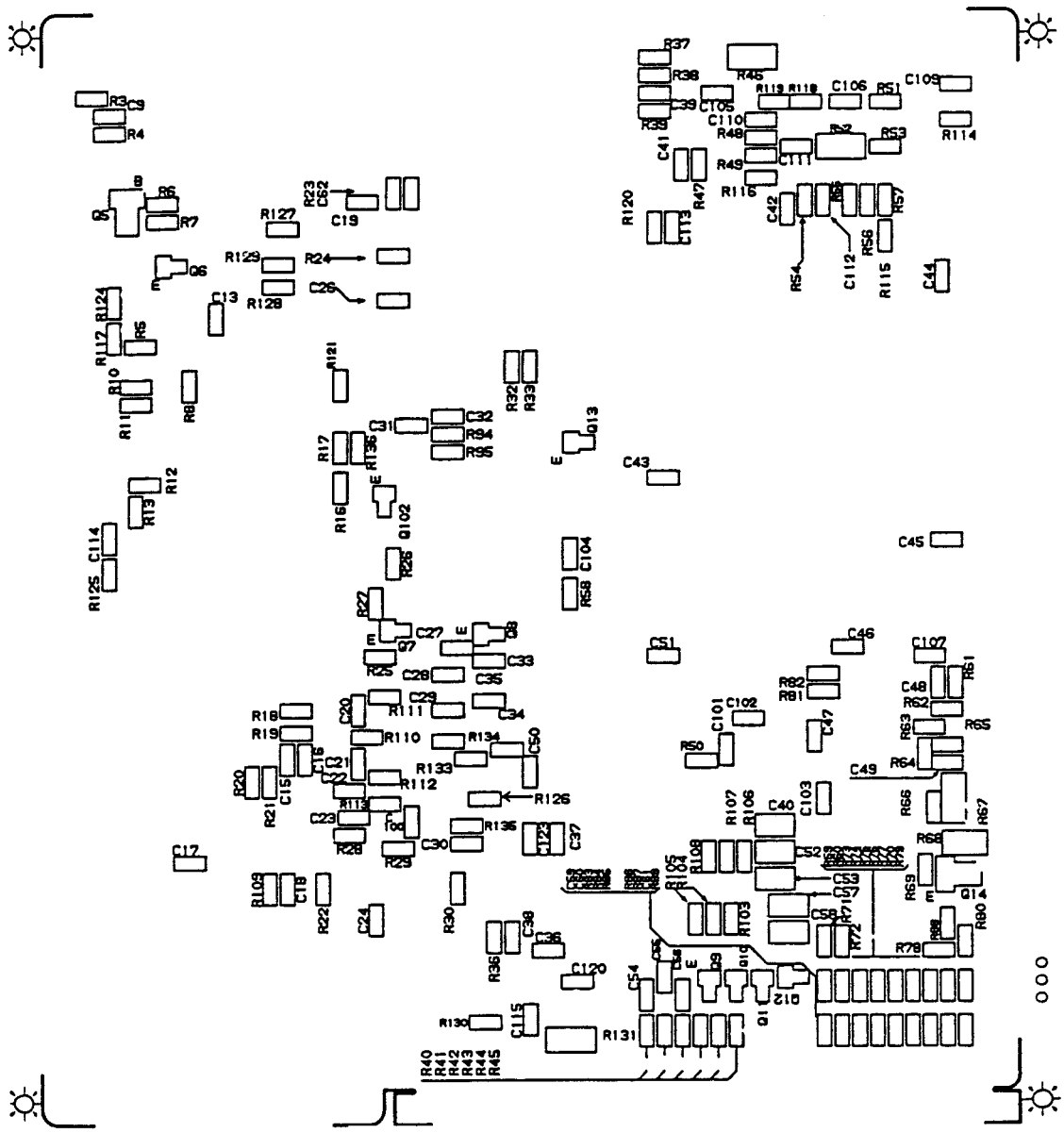
FUSE

F1	4822 253 30239	FUSE SSFR 3.0 AMPERE

DIGITAL SWITCH

SIDE A	4822 267 70321	DIGITAL SWITCH SIDE A
SIDE B	4822 267 70321	DIGITAL SWITCH SIDE B


21 BPMCON2 PCB
FHJB0004405
MADE IN JAPAN
4-089-01
CN3
CN1
CN14
CN13
CN12
CN15
CN4
CN5
CN6
CN7
CN8
CN9
CN10
CN11
IC1
IC3
IC4
IC5
IC6
X1
X2
X3
D1
D2
D3
D4
ZD2
T1A
C1
C2
C3
C4
C5
C7
C8
C108
C117
C118
C121
C122
R1
R2
R132
L1
L2
L3
Q103
Q701



PARTS OF MECHANICAL CONTROLLER 4822 212 60103

CONNECTORS

CN1	4822 267 51149	CONNECTOR
CN2	4822 267 51149	CONNECTOR
CN3	4822 265 41223	CONNECTOR
CN5	4822 265 20572	CONNECTOR
CN6	4822 265 20579	CONNECTOR
CN7	4822 265 20576	CONNECTOR
CN8	4822 265 20573	CONNECTOR
CN9	4822 267 41051	CONNECTOR
CN10	4822 265 20577	CONNECTOR
CN11	4822 265 41218	CONNECTOR
CN12	4822 265 20575	CONNECTOR
CN13	4822 265 20574	CONNECTOR
CN14	4822 265 20578	CONNECTOR

FUSE

FU1	4822 253 20224	FUSE CCV-1 AMPERE
FU2	4822 253 20224	FUSE CCV-1 AF12.5

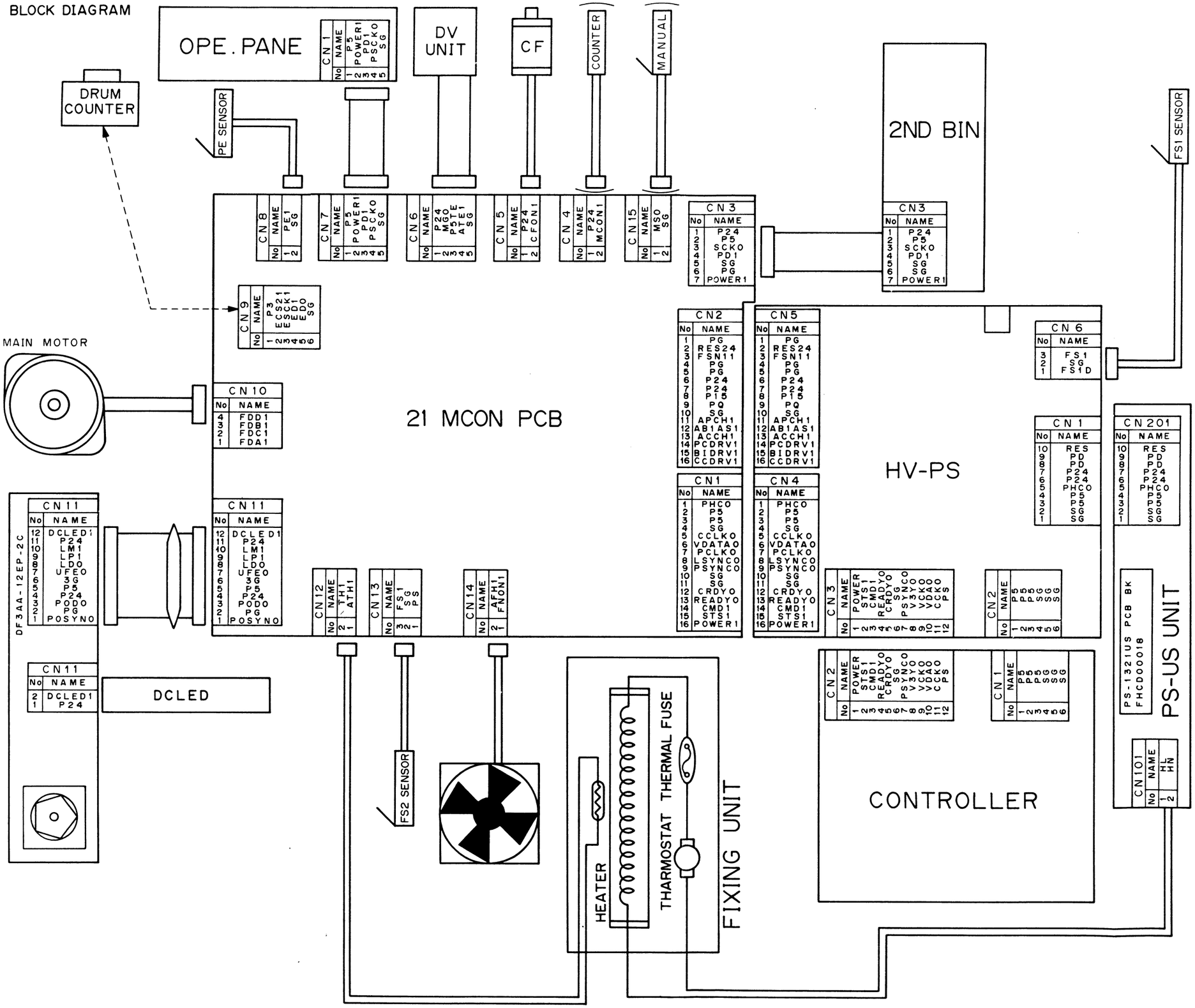
INTEGRATED CIRCUIT'S

IC1	4822 209 52237	EEPROM BR93CS46
IC2	4822 209 60923	RESET M51957BL
IC3	4822 209 31228	LINEAR UDN2916B
IC4	4822 209 52238	EC-A538
IC5	4822 209 31233	TTL SN74LS240NS
IC6	4822 209 31226	TTL SN74AS04NS
IC7	4822 209 31227	LINEAR RA10324
IC100	4822 209 60803	C-MOS TC74HC08AF-TP1
IC103	5322 209 73891	LINEAR TA78L005AP

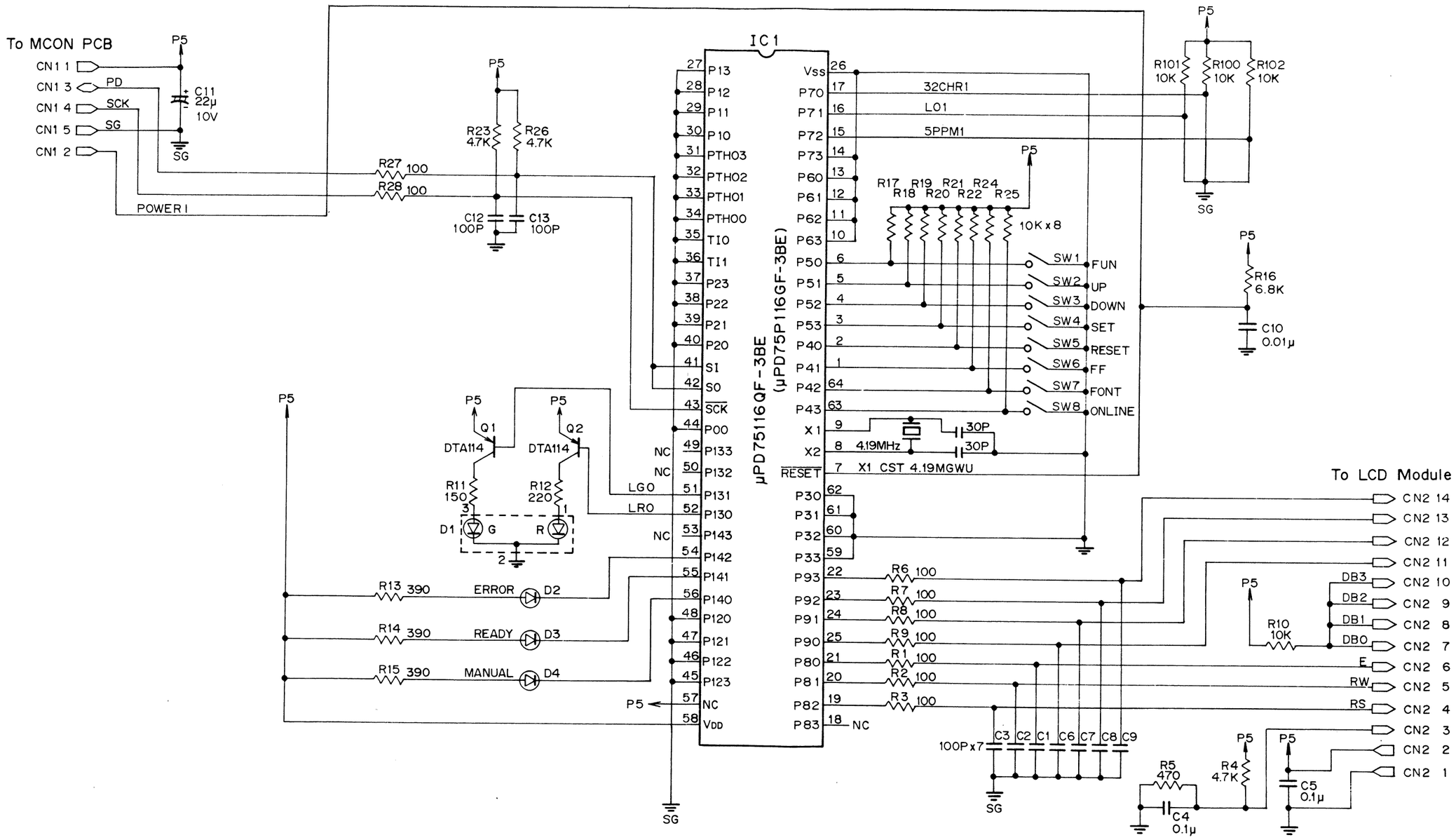
CRYSTAL

X2	4822 242 81192	CRYSTAL 20 MHZ

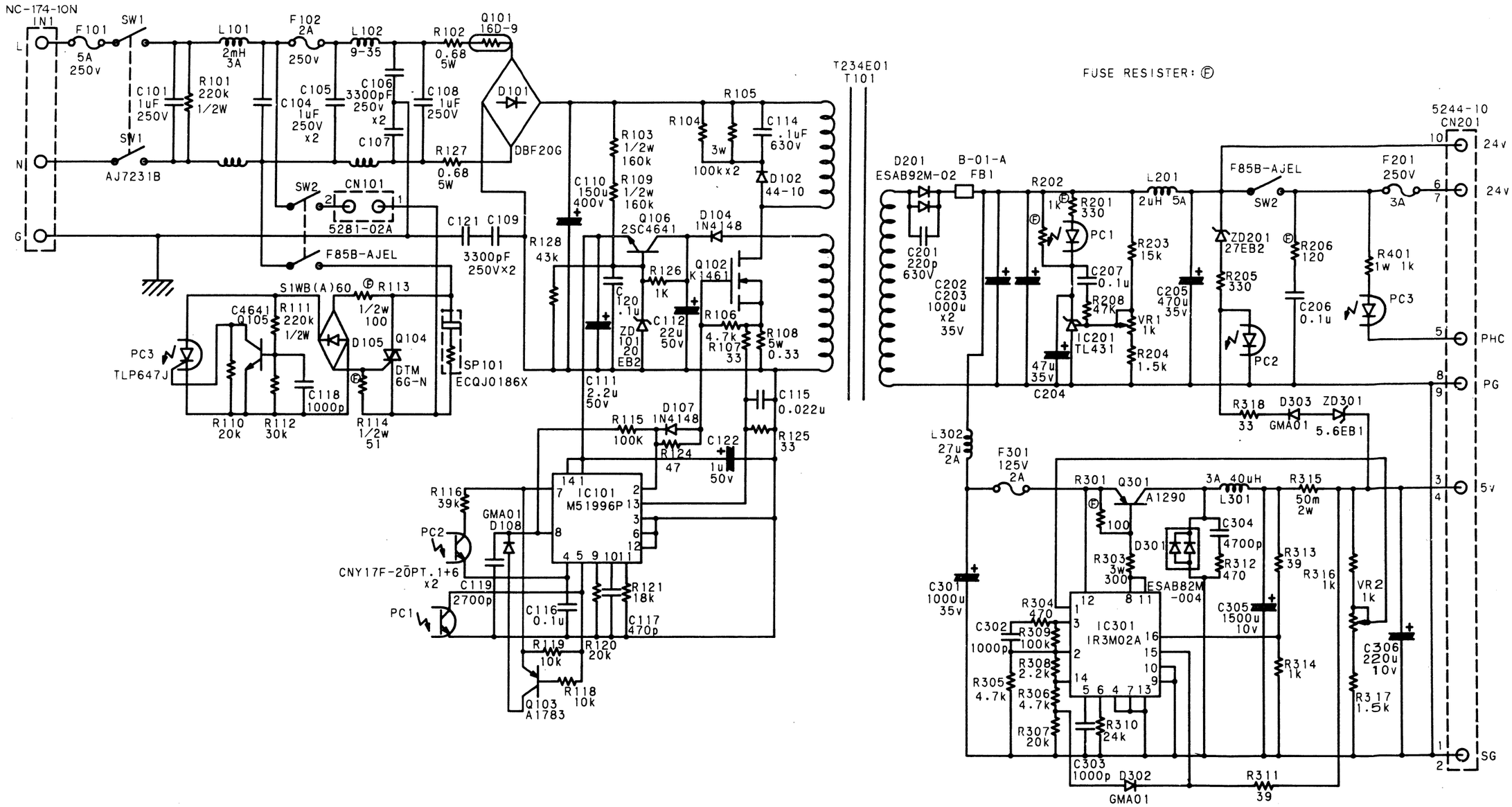
BLOCK DIAGRAM


OPE. PANE
CN1 No NAME 1 P5 2 POWER1 3 PD1 4 PSCKO 5 SG
DV UNIT
CF
COUNTER
MANUAL
DRUM COUNTER
PE SENSOR
2ND BIN
FS1 SENSOR
CN8 No NAME 1 PE1 2 SG
CN7 No NAME 1 P5 2 POWER1 3 PD1 4 PSCKO 5 SG
CN6 No NAME 1 P24 2 MGO 3 P5TE 4 ATE1 5 SG
CN5 No NAME 1 P24 2 CFON1
CN4 No NAME 1 P24 2 MCON1
CN15 No NAME 1 MSO 2 SG
CN3 No NAME 1 P24 2 P5 3 SCKO 4 PD1 5 SG 6 PG 7 POWER1
CN3 No NAME 1 P24 2 P5 3 SCKO 4 PD1 5 SG 6 SG 7 POWER1
CN9 No NAME 1 P3 2 ECS21 3 ESCK1 4 EDO 5 SG 6
MAIN MOTOR
CN10 No NAME 4 FDD1 3 FDB1 2 FDC1 1 FDA1
21 MCON PCB
CN2 No NAME 1 PG 2 RES24 3 FSN11 4 PG 5 PG 6 P24 7 P24 8 P15 9 PQ 10 SG 11 APCH1 12 AB1AS1 13 ACCH1 14 PCDRV1 15 BIDRV1 16 CCDRV1
CN5 No NAME 1 PG 2 RES24 3 FSN11 4 PG 5 PG 6 P24 7 P24 8 P15 9 PQ 10 SG 11 APCH1 12 AB1AS1 13 ACCH1 14 PCDRV1 15 BIDRV1 16 CCDRV1
CN6 No NAME 3 FS1 2 SG 1 FS1D
HV-PS
CN1 No NAME 10 RES 9 PD 8 PD 7 P24 6 P24 5 PHCO 4 P5 3 P5 2 SG 1 SG
CN201 No NAME 10 RES 9 PD 8 PD 7 P24 6 P24 5 PHCO 4 P5 3 P5 2 SG 1 SG
CN11 No NAME 12 DCLED1 11 P24 10 LM1 9 LP1 8 LDO 7 UFEO 6 3G 5 P5 4 P24 3 PODO 2 PG 1 POSYNO
CN11 No NAME 12 DCLED1 11 P24 10 LM1 9 LP1 8 LDO 7 UFEO 6 3G 5 P5 4 P24 3 PODO 2 PG 1 POSYNO
DF3AA-12EP-2C
CN11 No NAME 2 DCLED1 1 P24
DCLED
CN12 No NAME 2 TH1 1 ATH1
CN13 No NAME 3 FS1 2 SG 1 PS
CN14 No NAME 2 AFH1 1 FNON1
FS2 SENSOR
CN1 No NAME 1 PHCO 2 P5 3 P5 4 SG 5 CCLKO 6 VDATAO 7 PCLKO 8 LSYNCO 9 PSYNCO 10 SG 11 SG 12 CRDYO 13 READYO 14 CMD1 15 STS1 16 POWER1
CN4 No NAME 1 PHCO 2 P5 3 P5 4 SG 5 CCLKO 6 VDATAO 7 PCLKO 8 LSYNCO 9 PSYNCO 10 SG 11 SG 12 CRDYO 13 READYO 14 CMD1 15 STS1 16 POWER1
CN3 No NAME 1 POWER 2 STS1 3 CMD1 4 READYO 5 CRDYO 6 SG 7 PSYNCO 8 V3YO 9 VDAO 10 CCKO 11 CPS 12
CN2 No NAME 1 P5 2 P5 3 SG 4 SG 5 SG 6
CN2 No NAME 1 POWER 2 STS1 3 CMD1 4 READYO 5 CRDYO 6 SG 7 PSYNCO 8 V3YO 9 VDAO 10 CCKO 11 CPS 12
CN1 No NAME 1 P5 2 P5 3 P5 4 SG 5 SG 6 SG
PS-1321US PCB BK FHCD0018
PS-US UNIT
CONTROLLER
CN101 No NAME 1 HL 2 HN
THARMOSTAT THERMAL FUSE
HEATER
FIXING UNIT

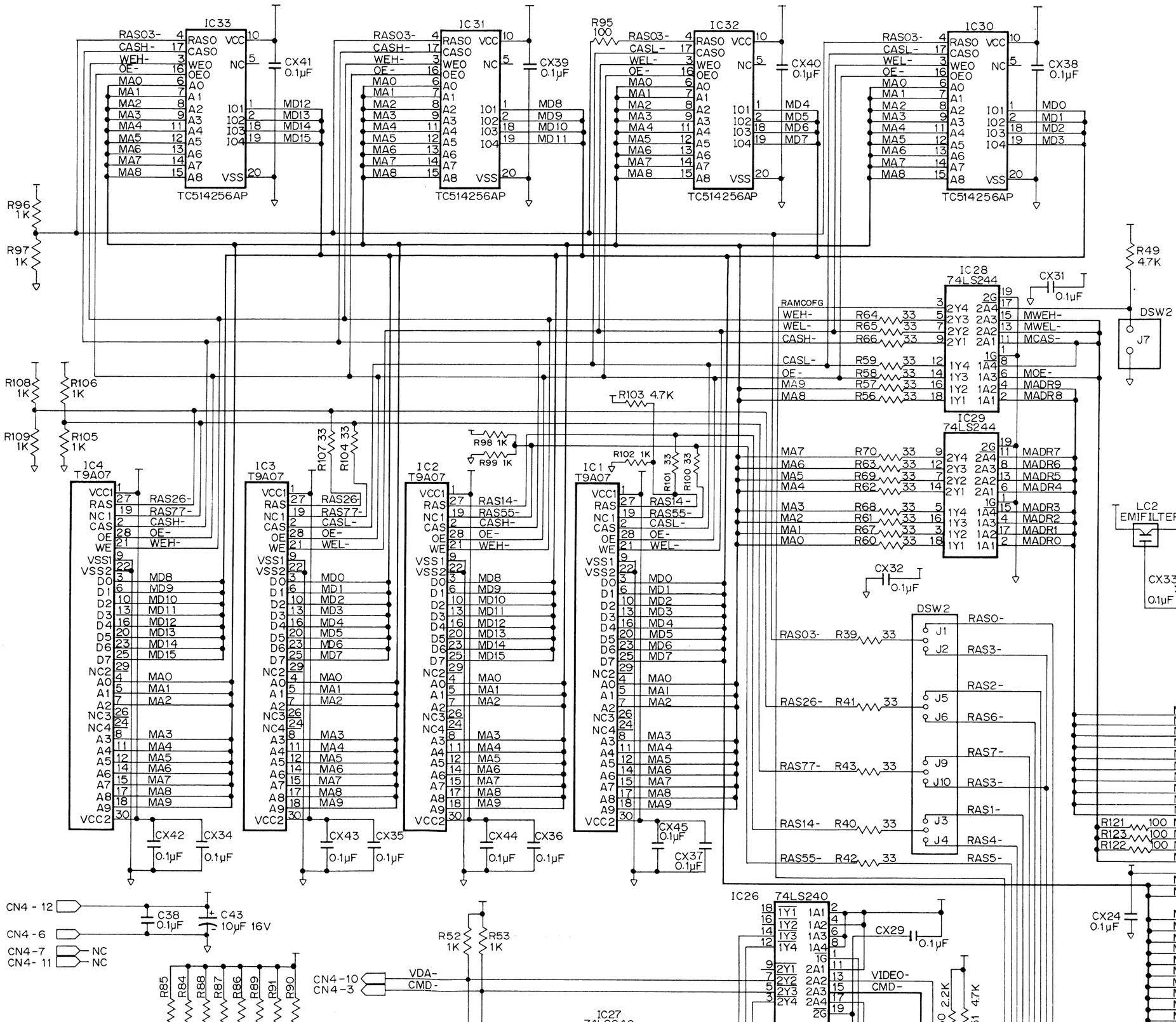
OPERATION PANEL CCT



PS UNIT CCT(200V)



MAIN CONTROLLER CCT



CN4-12
CN4-6
CN4-7 NC
CN4-11 NC
C38 0.1µF
C43 10µF 16V
R52 1K
R53 1K
CN4-10 VDA-
CN4-3 CMD-
R85 R84 R88 R87 R86 R89 R91 R90 1K
CN4-8 VSY-
CN4-9 VCK-
CN4-1 POWER1
CN4-2 STS-
R72 220
R71 220
R76 220
R75 220
CN2-1 STRO
CN2-31 INPO
CN4-4 READYO
CN4-5 CRDYO
R78 100
R77 100
R74 220
R73 220
47p C34 C33 C37 C36 C35
2.2K R80 R79 R83 R82 R81 R55 R54
0.1µF C39
100p C41 C40
IC27 74LS240
1A1 1A2 1A3 1A4 1G 2A1 2A2 2A3 2A4 2G
1Y1 1Y2 1Y3 1Y4 2Y1 2Y2 2Y3 2Y4
HSYNC
VCLK
STS-
P STRO
P INPO
READYO-
CRDYO-
CX30 0.1µF
C32 47pF
C31 47pF
C45 47pF
R50 2.2K
R51 4.7K
IC18 74LS244
CX29 0.1µF
VIDEO-
CMD-
CX24 0.1µF
MD13 MD12 MD11 MD10 MD 9 MD 8 MD 7 MD 6 MD 5 MD 4 MD 3 MD 2
GND1 MD13 MD12 MD11 MD10 MD 9 MD 8 MD 7 MD 6 MD 5 MD 4 MD 3 MD 2
MD1 MD0 MRAS7 MRAS6 MRAS5 MRAS4 MRAS3 MRAS2 MRAS1 MRAS0 A23 GND2 A22 A21 VCC2 A20 A19 A18 A17 A16 A15 A14 A13 A12 A11
XA22 XA21 XA20 68A19 68A18 68A17 68A16 68A15 68A14 68A13 68A12 68A11
CX21 0.1µF
CN3-3 S1 RXD R2 1K
CN3-5 S1 CTS R4 1K
C5 1000p
C7 1000p
C11 C13 C14 C12 470px4
1A 2A 3A 4A 1Y 2Y 3Y 4Y 1C 2C 3C 4C VCC GND
1489 IC8
J18 J19
CTSO
CN3-6 S1 DSR R6 1K
CN3-8 S1 CD R8 1K
CN3-19 S1 DTR2 J15
CN3-11 S1 DTR1 J13
CN3-23 S1 DTR J12
C8 1000p
C9 1000p
C16 10µF 25V
RB420D D2
C17 10µF 25V
IC5 MC145407
C2+ C1+ GND VCC C2- C1- VSS VDD
Rx1 Rx2 Rx3 Tx1 Tx2 Tx3 DO1 DO2 DO3 DI1 DI2 DI3
10µF 25V
RB420D D1
C3
C2 10µF 25V
DSRO CDO DTRO RTSO TXDO
RA1 10Kx4
CX7 0.1µF
CDO CTSO DSRO RXDO DTRO TXDO
CX2 0.1µF
CX8 0.1µF
IC6 26LS31
A+ A- B+ B- C+ C- D+ D- INA INB INC IND EN EN
CN3-10 S TXDP R10 1K
CN3-9 S TXDM R 9 1K
R7 4.7K
J14
CN3-20 S1 DTRO
CN3-4 S1 RTS
CN3-2 S1 TXD
CN3-7
CN3-1 S FG
J11
1K R12
1K R3
1K R1
C4 C6 C10 1000px3
CX3 0.1µF
PD0 PD1 PD2 PD3 PD4 PD5 PD6 PD7 PDAT10 PDAT11 PDAT12 PDAT13 PDAT14 PDAT15 PDAT16 PDAT17
68RST- RESETO
VDD1
CMD- CMDO
STS- STSO
CRDYO- CRDY1
READYO- READY1
68A1 68A2 68A3 68A4 68A5 68A16 68A 17 68A 18 68A 19 68A20 68A21 AD1 AD2 AD3 AD4 AD5 AD6 AD7 AD8 AD9 AD10 AD11 AD12 AD13 AD14 AD15 AD116 AD117 AD118 AD119 AD120 AD121
AD22 AD23 FAULTO SEL1 PE1 ACKO
CX4 0.1µF
NC :5,6,7,9,10,11,13,14,15
GND:8
VCC:16
1/2W (leod type)
CN3-25 S 5V 0.51 R11
10mm pitch
DSW1
P DIPSW1 P DIPSW2 P DIPSW3 P DIPSW4
ON OFF
RXDO
R15 100
CN3-18 S1 RXD P R5 1K
IC7 26LS32
A+ A- B+ B- C+ C- D+ D- OUTA OUTB OUTC OUTD EN EN
CX9 0.1µF
R44
10mm pitch
0.51 1/2W
(leod type)
CN2-18
NC :5,6,7,9,10,11,13,14,15
GND:8
VCC:16
NC :15,33,34,35
IC18-11
J17 J16
CN2-14 CN2-16 CN2-17
CN2-19 CN2-20 CN2-21 CN2-22 CN2-23 CN2-24 CN2-25 CN2-26 CN2-27 CN2-28 CN2-29 CN2-30
CN2-36 IC18-13
R19 1K
TR1 DTA114EF
BUZZER1
D3 1S1588
R24 270 1/4W 5mm pitch (leod type)
RA4 2.2K x8
CN2-2 CN2-4 CN2-6 CN2-8 CN2-9 CN2-7 CN2-5 CN2-3
R28 R30 R32 R34 R35 R33 R31 R29 100
IC12 74LS244
1A1 1A2 1A3 1A4 1G 2A1 2A2 2A3 2A4 2G
1Y1 1Y2 1Y3 1Y4 2Y1 2Y2 2Y3 2Y4
PD0 PD2 PD4 PD6 PD7 PD5 PD3 PD1
100p C20 C22 C24 C26 C27 C25 C23 C21
CX11 0.1µF
RA5 1K x5
CN2-32 CN2-12 CN2-13 CN2-10 CN2-11
CX10 0.1µF
74LS07 IC11
P FAULTO P PE1 P SEL1 P ACKO P BUSY1
RA2 2.2Kx5
P INPO J22
R93 4.7K
R20 100
SPEAKO

J20
Y68A18
68A18
J21
C30
10µF
16V
IC25
HN27C101G
IC24
HN27C101G
IC23
HN27C101G
IC22
HN27C101G
CX28 0.1µF
CX27 0.1µF
CX26 0.1µF
CX25 0.1µF
ROMOE-
EPROM-
RFONT-
CPUCLK
R92
33
CX23
0.1µF
R124
100
SYSCLK
IO-
R21
4.7K
R94
4.7K
IC21
D8801
R117 100
R116 100
R115 100
R126 100
PIRQ0
SIRQ0
INT5
CX22
0.1µF
VIDEO-
HSYNC
VCLK
AS-
R111 100
R112 100
R110 100
IC14
+5 : 14,49
GND : 16,53
HALT-
IPL2
IPL1
IPL0
DTACK-
BGACK-
BR-
CN5-50
CN6-50
CN5-2
CN5-26
CN6-2
CN6-26
FAS-
FAS
CX12 0.1µF
74LS04
IC15
CX15 0.1µF
CN6-1
CN6-4
CN6-27
CN5-1
CN5-4
CN5-27
LFCART-
RFCART-
IC13
74LS244
R36
R37
10K x2
LCARTIDO
RCARTIDO
CN5-49
CN6-49
PANRD-
RCART-
LCART-
CX20 0.1µF
IC20
74LS244
RA10
680 x 8
RA9
CX19 0.1µF
IC19
74LS244
CX18 0.1µF
IC18
74LS244
R45
4.7K
68A20
IC15
74LS04
RA8
680 x 4
CN2-14
CN2-36
FA1
FA2
FA3
FA4
FA5
FA6
FA7
FA8
FA9
FA10
FA11
FA12
FA13
FA14
FA15
FA16
FA17
FA18
FA19
FA20
CN5-29
CN5-5
CN5-30
CN5-6
CN5-31
CN5-7
CN5-32
CN5-8
CN5-33
CN5-9
CN5-34
CN5-10
CN5-35
CN5-11
CN5-36
CN5-12
CN5-37
CN5-13
CN5-38
CN5-14
CN6-29
CN6-5
CN6-30
CN6-6
CN6-31
CN6-7
CN6-32
CN6-8
CN6-33
CN6-9
CN6-34
CN6-10
CN6-35
CN6-11
CN6-36
CN6-12
CN6-37
CN6-13
CN6-38
CN6-14
FDO
CN5-39

IC21
D8801

IC10
EC-A452

68000L10

X2404

74LS04

74LS244

680x4 RA8

10K x8 RA7

10K x8 RA6

10K x8 RA3

10K x4 RA1

J8 DSW2

J22 J23 J24 J25 J26

CX1 CX4 CX5 CX6 CX7 CX13 CX14 CX16 CX17 CX21 0.1µF

C18 47pF

C19 C29 47pF

C1 C28 C42 C44 10µF 16V

LC1 EMIFILTER

F1

R13 R14 R16 R18 R22 R23 R26 R27 R38 R46 R47 R87 R93 R113 R114 R118 R119 R120 R125 4.7K

R20 100

R25 10K

CN2-14 CN2-36

CN5-3 CN6-3

CN1-1 CN1-2 CN1-3 CN1-4 CN1-5 CN1-6

OPRDO P INPO CARTRO-

PCS 59 660

MECHANICAL CONTROLLER2 CCT

CN1
CN1-16 POWER1
CN1-15 STS1
CN1-14 CMD1
CN1-13 READYO
CN1-12 CRDYO
CN1-11
CN1-10
CN1- 9 PSYNCO
CN1- 8 LSYNCO
CN1- 7 PCLKO
CN1- 6 VDATAO
CN1- 5 CCLKO
CN1- 4
CN1- 3
CN1- 2
CN1- 1 HEON O
52257-1610

R80 680 P5
R59 R60 R70 R79 R77 R76 R75 R74 R73 1Kx9 P5
C59 47pF x3 C60 C61 R89 R87 R86 R85 R84 R83 2.2Kx6 SG
R78 220
R72 220
R71 220
R81 R82 R88 2.2Kx3 SG
COMANO1

P24
Q12 DTC114
R45 12K R44 82K R43 9.1K
Q11 2SC3437 R106 10K R103 2.7K
Q10 2SC3437 R107 10K R104 2.7K
Q9 2SC3437 R108 10K R105 2.7K
SG

L1 L2
C4 22µ 10V C7 22µ 10V C8 22µ 10V C40 2.2µ C52 2.2µ C53 2.2µ C57 2.2µ C58 2.2µ
SG
J903
Q103 TA78L005AP IN OUT COM
C118 10µF 10V C120 0.1µF
ZD3
R131 0 P5
C115 0.1µF C117 10µF 10V
SG GND

CN2
CN2-16 CCDRV1
CN2-15 BIDRV1
CN2-14 PCDRV1
CN2-13 AINCCH1 R42 220
CN2-12 AINBIAS1 R41 220
CN2-11 AINPCH1 R40 220
CN2-10 AOREF
CN2- 9 P9 P18
CN2- 8
CN2- 7 P24
CN2- 6
CN2- 5
CN2- 4 PG
CN2- 3 FS11
CN2- 2 RESP24
CN2- 1
52257-1610

C54 C55 C56 0.1µF x 3 SG
C1 100µ 35V C108 100µ 35V PG
R130 10K P5

POWER1
STS1
READYO
CRDYO
PSYNCO
LSYNCO
PCLKO
CCKO
VDAO
COMANO1
HEON1
RESETO

C103 0.1µ SG

IC6 74LS14
8 Y4 GND 7 SG
9 A4 Y3 6
10 Y5 A3 5
11 A5 Y2 4
12 Y6 A2 3
13 A6 Y1 2
14 VCC A1 1
P5
C47 0.1µ SG
C101 0.1µ SG
RESETO

CN14 FAN-2 FAN-1 5268-02A
P18 P24
D4 1SR139-100
R69 1K
R68 3.9K 1/4W
Q14 2SB1189
R66 1M
R67 22 1/2W PG
C50 0.1µ SG
Q8 DTC114EK
AINFN1
FDON1
SG

CN13 FS2-2 FS2-1 DF3A-2P-2DS (10)
SG
P5
R64 10K
C49 0.1µ SG
R65 100
FS12

POWER1
PSYNCO
LSYNCO
PCLKO
RESET1
C102 0.1µ SG
STS1
READYO
CRDYO
VDATA1
CCLK1
RLP1
FLP1
POSYNO
POSYN1
UFEO
UFE1
CHDO
AOREF
AINTH1
AINCC1
AINBI1
AINPC1

LDO
IC5 74LS240
11 2A1 GND 1
12 1Y4 2Y1 2
13 2A2 1A4 3
14 1Y3 2Y2 4
15 2A3 1A3 5
16 1Y2 2Y3 6
17 2A4 1A2 7
18 1Y1 2Y4 8
19 2G 1A1 9
20 VCC 1G 1
P5 P5
C51 0.1µ SG
CRDY1
PCLK1
LSYNC1
PSYNC1
CCLK1
READY1
STSO
AINTH1
AOREF
POSYNO
UFEO
RLP1
FLP1
AINLD1
AINLM1
AINTE1
POSYN1

P5
C30 1000p
C34 1000p
C33 0.1µ
C37 0.1µ
C36 1000p
GND

IC4
VRFH 30
VRFL 29
AINPC1 28
AINBI1 27
AINCC1 26
AINFN1 25
AINTH1 24
AINDL1 23
AINLM1 22
AINTE1 21
ASVSS 20
ASVDD 19
VSS5 18
CCLK1 17
VDD1 16
VSS4 15
VDATA1 14
VSS3 13
PCLK1 12
VSS2 11
LSYNC1 10
PSYNC1 9
CRDY1 8
FS21 7
READY1 6
CMDO 5
STSO 4
VSS1 3
UFE1 2
POSYN1 1
SG
ADVDD 31
ADVSS 32
DAVSS 33
DAVDD 34
FLP1 35
RLP1 36
AVSS2 37
GND
SRALO 38
FDATO 39
VSS6 40
VSS15 10
LD1 9
VSS14 9
POD1 9
DCLED1 9
FDON1 9
FDA1 9
FDB1 9
FDC1 9
VDD4 9

CN2- 3
CN2- 2
CN2- 1
52257-1610
FS11
RESP24
PG

R22 9.1K
R28 1K
C5 1µ 10V
C18 0.33µ
IC2 M51957BP
R109 3.9K
C17 0.1µ
C43 C44 C45 C46 0.1µF x 4
SG
P5
RESETO

POWER1
PCCLK1
BICLK1
CCCLK1
HEON1
RESETO
RLP1
FLP1

C29 0.1µ
C35 1000p
R30 10K
R29 220
R36 220
C38 0.1µ
C100 0.1µ

32	ADVSS
33	DAVSS
34	DAVDD
35	FLP1
36	RLP1
37	AVSS2
38	SRALO
39	FDATO
40	VSS6
41	VDD2
42	CCCLKO
43	BICLKO
44	PCCLKO
45	VSS7
46	HEON1
47	TSRESO
48	RESRFO
49	FS11
50	VSS8

GND

IC 4
XTALA 4
(EC-A538)

| | | |

CN13
FS2-2
FS2-1
DF3A-2P-2DS (10)
SG
P5
R64 10K
C49 0.1µ
R65 100
SG
FS12
CN12
TH-2
TH-1
DF3A-2P-2DS (18)
R62 220
C48 0.1µ
R61 2.4K 1%
AINTH1
SG
SG
P5
R63 470
C107 0.1µ
ZD2
HZ3A-1
SG
AOREF
POSYNO
UFEO
LDO
PODO
Q13
DTC114
PG
P9
C42 0.1µ
R49 10K
C110 0.1µ
R48 10K
C111 0.1µ
SG
IC7
BA10324
R57 30K 1%
R115 4.7K
R54 75K 1%
R116 4.7K
R55 20K 1%
R56 39K 1%
C112 0.1µ
R53 13K 1%
R52 16 1/2W
C106 470p
R51 1K
2SB562
Q4
R114 4.7K
C109 6800p
P5
P9
P24
R50 4.7K
R58 4.7K
POSYNO
PODO
UFEO
LDO
LSPWRC
ANLGLM
LEDONO
CN11
DPT-1
DPT-2
DPT-3
DPT-4
DPT-5
DPT-6
DPT-7
DPT-8
DPT-9
DPT-10
DPT-11
DPT-12
DF3A-12P-2DSA
LDO
IC5
74LS240
2A1 GND
1Y4 2Y1
2A2 1A4
1Y3 2Y2
2A3 1A3
1Y2 2Y3
2A4 1A2
1Y1 2Y4
2G 1A1
VCC 1G
PCLK1
LSYNC1
PSYNC1
CRDY1
READY1
STSO
AINTH1
AOREF
POSYNO
UFEO
RLP1
FLP1
AINLD1
AINLM1
AINTE1
LD1
FDON1
POSYN1
P5
C51 0.1µ
SG
CUT 701
C104 100p
C105 100p
SG
SG
AINLM1
DCLED1
AINDL1
R47 220 LO:2K
R39 10K
Q3 2SC2308
R38 10K
R37 47
C41 LO: 0.001µ
0.047µ
C39 0.1µ
SG
SG
PG
L3
R46 820 1/2W
PG SG
P24
FU2 1A
R132 1/2W
C122 220µ 35V
C121 220µ 35V
C19 0.1µ
PG
CN10
PHA
PHA-
PHB
PHB-
FD-1
FD-2
FD-3
FD-4
DF3A-4P-2DSA
IC3
UDN29168
OUT1A
OUT2A
E2
SENSE2
OUT2B
GND
GND
IO2
I12
PHASE2
VREF2
RC2
P24
E1
SENSE1
OUT1B
IO1
GND
GND
I11
PHASE1
VREF1
RC1
P5
MOSETO
MOSET1
P5
R33 1.5K
R32 910
SG
C33 0.1µ
VSS4
VDATA1
VSS3
PCLK1
VSS2
LSYNC1
PSYNC1
CRDY1
FS21
READY1
CMDO
STSO
VSS1
UFE1
POSYN1
SG
VSS15
LD1
VSS14
POD1
DCLED1
100
99
98
97
96
POSYN1
AINTE1
COO
POD1
DCLED1
P5
P24
R26
R25 4.7K
COO
Q7 2SC2412K
R27 2.2K
SG
R24 470
C32 1000pF
R94 22K
R2 0.47 1W
C26 1000pF
C62 1000pF
R23 470
R1 0.47 1W
R95 22K
C31 1000pF

IC 4
X TALA 4
EC-A538)

VSS15 100
LD1 99
VSS14 98
POD1 97
DCLED1 96
FDON1 95
FDA1 94
FDB1 93
FDC1 92
VDD4 91
VSS13 90
FDD1 89
COO 88
PRE1 87
ECS11 86
ECS21 85
ESCK1 84
E1DO 83
PE1 82
VSS12 81

POD1
DCLED1
POSYN1
AINTE1
COO

R27 2.2K
SG

C32 1000pF
R94 22K
R2 0.47 1W
C26 1000pF
R24 470
R23 470
C62 1000pF
R1 0.47 1W
R95 22K
C31 1000pF
SG
PG

MOSET1
MOSET0

P5
C27 0.1µ

E2DO
PRE1
ECS11
ECS21
ESCK1
E1DO

ROMSPLY0
Q102 DTA114

IC100 74HC08
R127 1K
R128 1K
R129 1K
R17 1K
R16 1K
R136 47K

IC1 93CS46
CS VCC
SK PRE
DI PE
DO GND
C13 0.1µ
R121 10K

CN9
P5
DRUM-1
DRUM-2
DRUM-3
DRUM-4
DRUM-5
DRUM-6
DRCS1
DRSCK1
DRDI1
DRDO1
DF3-6S-2DSA

VSS9 66
M2CK00 67
M2CK11 68
VSS10 69
V1CK11 70
V1CK00 71
VSS11 72
TSDB6 73
TSDB7 74
MCON1 75
CFON1 76
TSIG1 77
PSCKO 78
PD1 79
MGON1 80

R18 100
R19 100
R21 10K
R20 10K
R110 1M
R111 10
X3 11.6508MHz NR-18/38C
C15 100p
C16 100p
C22 x2
C21 10p x2
C20
SG

MDSET1
MDSETO
ROMSPLYO
TESPLYO
PE1
MGON1
TESPLY1

Q6 DTA143EK

P24
D2 1SR139-100
2SD1860
R13 2.7K
R12 10K
Q1
R11 2.7K
R10 10K
MCON1
CFON1
CN5 CF-1 CF-2 DF3A-2P-2DSA

CN7 PNL-1 PNL-2 PNL-3 PNL-4 PNL-5 DF3A-5P-2DS
POWER1
PD1
PSCKO

AINTE1
R5 220K
R8 82K
C2 1µF 10V
P9
BA10324
IC7
R120 1M
C113 0.1µ
R118 10K
R119 10K
R117 4.7K
R124 470K

R7 6.8K
2SD1834
Q5
1SR139-100
D1
FU1 1A
C3 4.7µ 35V
R6 10K
CN6 DEV-1 DEV-2 DEV-3 DEV-4 DEV-5 5267-05A
MG+
MG-
SPPLY5
ANLGTE

C9 0.1µ
R4 10K
R3 100
CN8 PE-1 PE-2 DF3A-2P-2DSA
ANLGPE